User's Guide

Service Addendum

A1200

Commodore
AMIGA

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User's Guide

Service Addendum

A1200

INTERNATIONAL EDITION

Commodore "International Edition" service manuals contain part number information which may vary according to country. Some parts may not be available in all countries.

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Table of Contents

Section 1 - A1200 User's Guide

Chapter 1
Quick Connect

Before You Begin 1-1
As You Set Up Your System 1-2
Main Unit 1-5
Attaching the Mouse 1-6
Attaching a Monitor 1-6
RGB Monitors 1-7
Composite Monitors 1-7
NTSC Televisions 1-9
PAL Televisions 1-10
SCART Televisions 1-10
Connecting Optional Equipment 1-10
Audio Connection 1-11
Audio Connection to a Stereo Monitor 1-11
Audio Connection to a Monaural Monitor 1-11
Audio Connection to Other Equipment 1-12
Attaching an External Floppy Drive 1-12
Attaching a Parallel Device 1-12
Attaching a Serial Device 1-12
Attaching a Joystick 1-13
Connecting Power and Turning On the Amiga 1-13

Chapter 2
Getting Started

Booting Floppy-Based Systems 2-1
Booting Hard Disk-Based Systems 2-1
The Opening Screen 2-2
Turning Off the Amiga 2-3
The Amiga Keyboard 2-3
The Main Keyboard Area 2-5
Shift Keys 2-5
Alt Keys 2-5
Ctrl 2-6

Left Amiga....2-6
Right Amiga....2-6
Return....2-6
Caps Lock....2-7
Esc....2-7
Tab....2-7
Backspace....2-7
The Numeric Keypad....2-8
The Function Keys....2-8
The Del, Help, and Arrow Keys....2-8
Del....2-8
Help....2-8
The Arrow Keypad....2-9
Keyboard Equivalents to the Mouse....2-9

Chapter 3
Before Expanding Your System

Memory Expansion....3-1
Drive Expansion....3-2
CPU Expansion....3-2
PCMCIA Expansion....3-2
When Installing Internal Options....3-3
ESD Precautions....3-4

Chapter 4
Using PCMCIA Cards

Inserting and Removing Card Slot Devices....4-1
Memory Cards....4-2
Write-Protection....4-2
Card Battery....4-3
Cards Prepared as RAM....4-3
Cards Prepared as Disk....4-3
ROM Applications....4-4
Other Devices....4-4
Notes on Insertion and Removal....4-4

Chapter 5
Help With System Problems

Avoiding Problems....5-1
Identifying and Solving Problems....5-2
Software Problems....5-2
Startup Problems....5-3
Disk Problems....5-4
Notes on Floppy-Based Systems....5-4
Notes on Hard Disk Systems....5-4

Installation and Maintenance Problems 5-5
Installation Problems 5-6
Maintenance Problems 5-6
Non User-Serviceable Problems 5-6

Appendix A
Technical Specifications

Appendix B
Input/Output Connector Pin Assignments

SERIAL Port B-2
PARALLEL Port B-4
VIDEO Port B-6
MOUSE Ports B-8
DISK DRIVE (floppy) Port B-9
CPU Slot B-10

Appendix C
Using Floppy Disks

Using 3.5-Inch Floppy Disks C-1
Guidelines for Using Disks C-3

Appendix D
Amiga Character Set

Index

Section 2 - A1200 Service Addendum

Chapter 1
Introduction

System Features 1-1
A1200 User's Guide 1-2

Chapter 2
Diagnostics

System Startup 2-1
Third Party Diagnostics 2-2
Memory 2-2
Ports 2-2

Chapter 3
Replacing and Adding Boards and Options

Replacing the Floppy Disk Drive 3-1
Adding a Real-Time Clock (RTC) 3-3
Replacing the Motherboard 3-4

Chapter 4
Bill of Materials

Chapter 5
System Specification

A1200/A1200HD Functional Specification 5-1
Introduction 5-1
Basic Objectives 5-1
Block Diagram 5-1
Features 5-3
CPU 5-3
Memory and Expansion 5-3
ROM 5-3
Mass Storage 5-3
AA Custom Chips 5-3
Video 5-4

System I/O 5-5
Expansion 5-6
ASICs 5-7
A1200 Power Supply 5-7
Mechanical/Appearance 5-8
A1200 Memory Map 5-8
Environmental Specification 5-9
External Connector Pinouts 5-9
Video Connectors 5-9
RGB Video (DB23 Male) 5-9
Color Composite Video (RCA Jack) 5-9
RF Modulator (RCA Phono Jack, Channel Select SW) 5-10
External System I/O 5-10
Floppy Port (DB23 Female) 5-10
Serial Port (DB25 Male) 5-10
Stereo Audio Ports 5-11
Parallel Port (DB25 Female) 5-11
Mouse/Game Ports 5-12
Power Connector (5 Pin Square DIN) 5-12
Internal Connector Pinouts 5-12
Internal System I/O 5-12
Internal Floppy Signal (Header, 34 Pin DIL) 5-12
Internal Floppy Power (Header, 4 Pin SIL) 5-13
Internal IDE Signal/Power (Header, 44 Pin DIL) 5-14
Keyboard Membrane (31 Pin Locking ZIF, FFC) 5-14
Internal Keyboard LEDS (Header, 5 Pin SIL, keyed) 5-15
Expansion Connector Pinouts 5-15
PCMCIA PC Card 2.0 (68 Pin Rt. Angle) 5-16
Block Diagrams 5-17
150-Pin Card Edge Connector 6-1

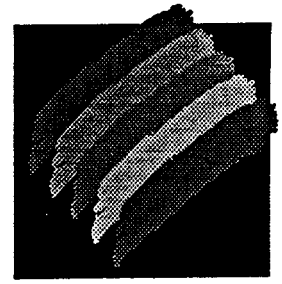
Chapter 6
Schematics

A1200 PCB Assembly Schematics 6-1

User's Guide

A1200

AMIGA



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WARNING

Installation information in this document is for reference only. All installation of internal optional devices or equipment including third-party optional devices or equipment, should be performed by an experienced and knowledgeable technician. All servicing or upgrading of original or optional devices or equipment should also be performed by an experienced and knowledgeable technician. UNAUTHORIZED INSTALLATION, SERVICING OR UPGRADING MAY VOID YOUR WARRANTIES.

This manual provides a general description of various product configurations and features currently planned for inclusion in Commodore's product line. The configurations and features described may not be available or otherwise apply to your particular system. Please consult your Commodore dealer with any questions.

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NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used according with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CAUTION: Only equipment with shield-grounded cables (computer input-output devices, terminals, printers, etc.) certified to comply with appropriate FCC limits can be attached to this device. Operation with non-certified equipment may result in communications interference. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the device.

This digital apparatus does not exceed the Class B electromagnetic noise emission limits for digital apparatus as defined in the radio interference regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de Classe B prescrites dans le réglement sur le brouillage radioélectriques édicté par le Ministére des Communications du Canada.

This book was produced using a variety of Commodore systems by Ross Hippely, Wilson Harp, and Carina Ahren.

P/N: 368 997-01

Section 1 - A1200 User's Guide
Table of Contents

Chapter 1
Quick Connect

Before You Begin **1-1**
As You Set Up Your System **1-1**
Main Unit **1-2**
Attaching the Mouse 1-5
Attaching a Monitor 1-6
RGB Monitors 1-6
Composite Monitors 1-7
NTSC Televisions 1-7
PAL Televisions 1-9
SCART Televisions 1-10
Connecting Optional Equipment **1-10**
Audio Connection 1-10
Audio Connection to a Stereo Monitor 1-11
Audio Connection to a Monaural Monitor 1-11
Audio Connection to Other Equipment 1-11
Attaching an External Floppy Drive 1-12
Attaching a Parallel Device 1-12
Attaching a Serial Device 1-12
Attaching a Joystick 1-12
Connecting Power and Turning On the Amiga **1-13**

Chapter 2
Getting Started

Booting Floppy-Based Systems 2-1
Booting Hard Disk-Based Systems 2-1
The Opening Screen 2-2
Turning Off the Amiga 2-3
The Amiga Keyboard 2-3
The Main Keyboard Area 2-5
Shift Keys 2-5
Alt Keys 2-5
Ctrl 2-6
Left Amiga 2-6
Right Amiga 2-6
Return 2-6
Caps Lock 2-6
Esc 2-7
Tab 2-7
Backspace 2-7
The Numeric Keypad 2-7
The Function Keys 2-8
The Del, Help, and Arrow Keys 2-8
Del 2-8
Help 2-8
The Arrow Keypad 2-8
Keyboard Equivalents to the Mouse 2-9

Chapter 3
Before Expanding Your System

Memory Expansion 3-1
Drive Expansion 3-2
CPU Expansion 3-2
PCMCIA Expansion 3-2
When Installing Internal Options 3-3
ESD Precautions 3-4

Chapter 4
Using PCMCIA Cards

Inserting and Removing Card Slot Devices 4-1
Memory Cards 4-2
Write-Protection 4-2
Card Battery 4-3
Cards Prepared as RAM 4-3
Cards Prepared as Disk 4-3
ROM Applications 4-4
Other Devices 4-4
Notes on Insertion and Removal 4-4

Chapter 5
Help With System Problems

Avoiding Problems 5-1
Identifying and Solving Problems 5-2
Software Problems 5-2
Startup Problems 5-3
Disk Problems 5-4
Notes on Floppy-Based Systems 5-4
Notes on Hard Disk Systems 5-4
Installation and Maintenance Problems 5-5
Installation Problems 5-6
Maintenance Problems 5-6
Non User-Serviceable Problems 5-6

Appendix A
Technical Specifications

Appendix B
Input/Output Connector Pin Assignments

SERIAL Port..... B-2
PARALLEL Port..... B-4
VIDEO Port..... B-6
MOUSE Ports..... B-8
DISK DRIVE (floppy) Port..... B-9
CPU Slot..... B-10

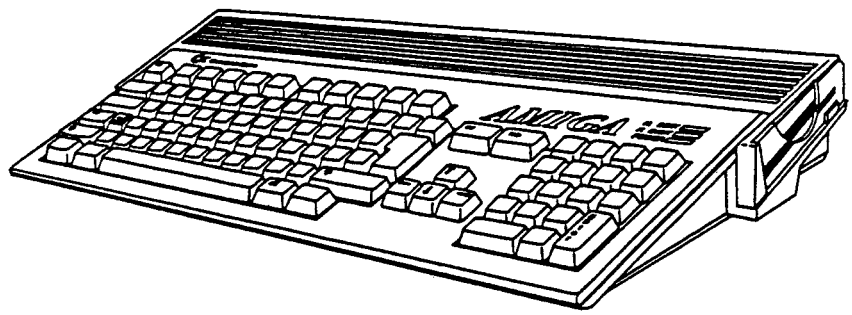
Appendix C
Using Floppy Disks

Using 3.5-Inch Floppy Disks..... C-1
Guidelines for Using Disks..... C-3

Appendix D
Amiga Character Set

Index

Welcome



The hardware strengths of the Commodore® Amiga® family of personal computers make the Amiga the computer platform of choice for video, multimedia, 3-D modeling, animation, and other graphics-intensive applications. The Amiga 1200 line features more sophisticated standard graphics capabilities and a compact, expandable base unit for maximum flexibility.

Features

The Amiga 1200 (A1200) offers a set of advanced features, including:

- Motorola 68EC020 microprocessor running at 14 MHz
- Factory-installed Motorola Floating Point Unit (FPU) available
- AA custom chipset offering graphics with 256 colors from a palette of 16.8 million in all color modes
- Built-in de-interlacing of NTSC and PAL video modes

- Up to 2 megabytes 32-bit "Chip" memory
- IDE (16-bit) hard drive interface
- Optional internal 2.5-inch hard drive
- Integral full-size keyboard with numeric keypad
- PCMCIA "credit card" memory/accessory slot
- Internal 150-pin "local bus" CPU slot
- Expandable to 8 megabytes "Fast" memory
- RGB, color composite, and RF (television) outputs
- Built-in 880 KB floppy disk drive
- Four-voice stereo sound output

Using this Guide

This guide is designed to help you set up your Amiga system quickly and safely. It contains information on making the necessary external connections, adding internal and external expansion options, and other hardware-related tasks. Once your Amiga system is up and running properly, you should be able to put this manual aside until such time as you add expansion hardware or need technical information.

Consult the other Amiga documentation included with your system for software information.

Document Conventions

In this and other Amiga documentation from Commodore, the following conventions are used:

Amiga, A1200	The Amiga 1200 main unit is usually referred to as the A1200 or the Amiga.
Key1 + Key2	Key combinations with a plus (+) sign between the keys indicate pressing the keys simultaneously. For example, Right Amiga+O means to hold down the right Amiga key and, while holding it down, press O.

Amiga keys	These two keys on the Amiga keyboard are used for special functions. The left Amiga key is to the left of the space bar and is marked with a large solid A. The right Amiga key is to the right of the space bar and is marked with an outlined A. Unlike Shift and Alt key pairs, the two Amiga keys usually have different functions.
Enter	Directions to "enter" something mean to type in the indicated information and then press Return.
arrow keys	The arrow keys are the four keys in an inverted-T formation to the right of the main keyboard, with arrows on them pointing up, down, left, and right. Do not confuse these keys with others on the keyboard marked with arrows.

Related Documentation

- *Workbench™ User's Guide*
- *AmigaDOS™ User's Guide*
- *ARexx User's Guide*
- *The Amiga Hard Drive User's Guide*

If you come upon terms in this book that you do not understand, look in the Glossary of the *Workbench User's Guide*, which defines many computer and Amiga-specific terms.

Chapter 1

Quick Connect

As you unpack your system, check the items in the system box. Contact your dealer immediately if anything is damaged.

This chapter guides you through setting up your system. Read the instructions carefully.

Before You Begin

- Choose a location for your system away from heat, dust, smoke, vibration and electrical interference.
- Choose a stable work surface at least 6 in./15 cm away from a wall.
- Have on hand a multi-outlet power strip with surge protection. (These units are available from most computer stores.) Commodore strongly recommends that you use this type of outlet to protect your system from electrical problems.
- Make sure your equipment matches the electrical requirements for the country in which you are using the computer. For example, you can't use a 110/115 volt model in countries having a 220/240 volt system.
- Read the descriptions in this chapter to acquaint yourself with the purpose and function of each feature and connector.

As You Set Up Your System

- If possible, plug your system into a separate circuit to avoid any electrical interference. Voltage surges and drops caused by

devices such as air conditioners, fans and vacuum cleaners can cause damage to your computer data and/or to the computer itself.

- Look at your system and match the features and connectors with the illustrations in this chapter. Use the illustrations to help you identify the lights, switches, connectors and disk drive.
- Use the instructions to connect the monitor, mouse, and any optional peripherals to the system unit. All connectors are shaped so they fit only one way. Don't try to force a cable into a connector.
- Never connect or disconnect any equipment when the system power is on!
- If you have a problem, always check the instructions before proceeding, especially the illustrations. Remember, you can cause damage by not following instructions.

Main Unit

The main unit case contains the basic components that run your computer. The system motherboard, disk drives, and optional expansion module are located in the main unit. Most other parts of your computer system connect to the main unit by cables.

The top panel, illustrated in Figure 1-1, identifies system features such as the keyboard and disk drive activity lights.

The right side panel, illustrated in Figure 1-2, shows the floppy drive slot and disk eject button.

The left side panel, illustrated in Figure 1-3, shows the PCMCIA card slot.

The bottom panel, illustrated in Figure 1-4, shows the location of the CPU expansion slot door.

The rear panel, illustrated in Figure 1-5, shows you where the other parts of your system (for example, the monitor and mouse) plug into the main unit.

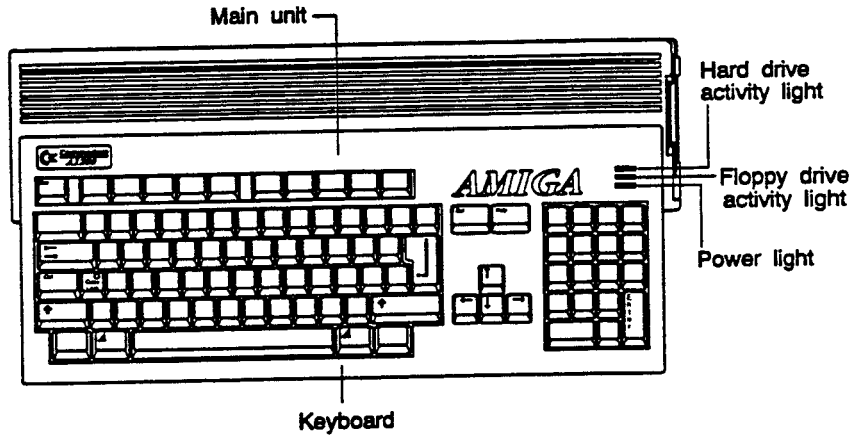


Figure 1-1. A1200 top panel

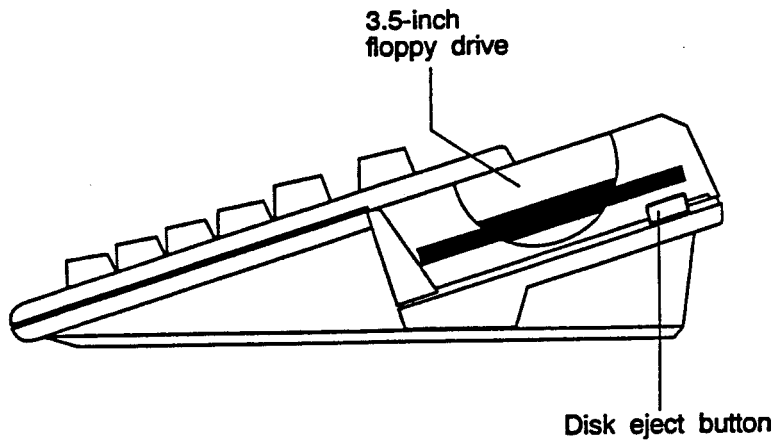


Figure 1-2. A1200 right side

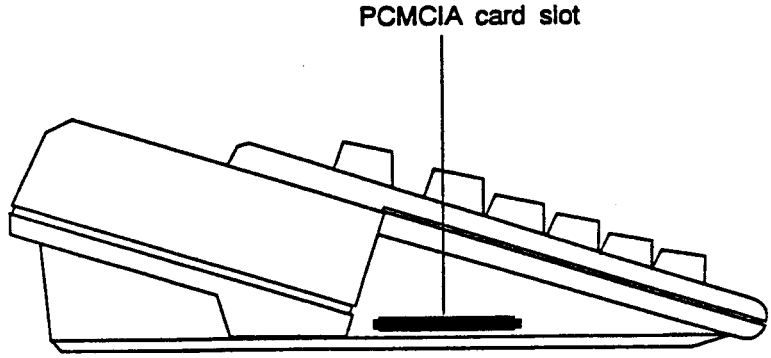


Figure 1-3. A1200 left side

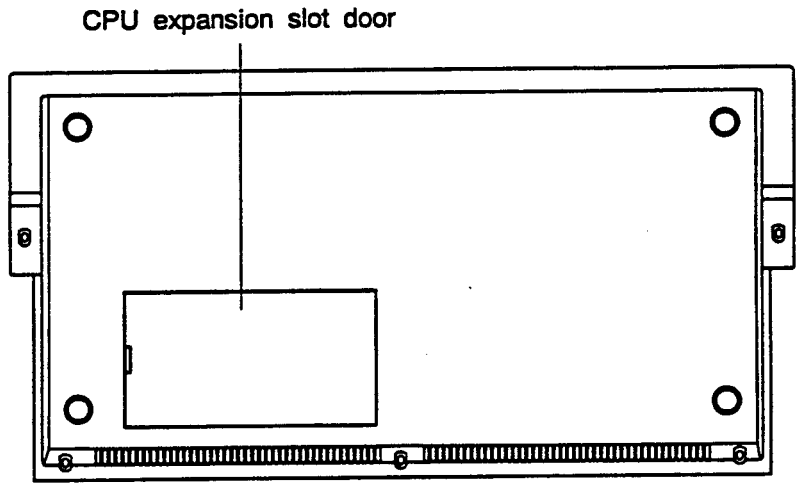


Figure 1-4. A1200 bottom

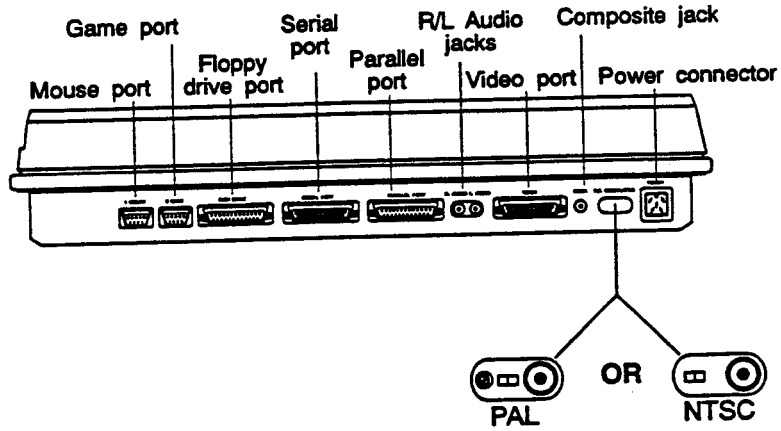


Figure 1-5. A1200 rear panel

Begin setting up your Amiga system by connecting the mouse and connecting the monitor.

Attaching the Mouse

To attach the mouse, plug the mouse cable into the port labeled MOUSE on the rear of the Amiga. Press firmly, but do not force. The cable connector is designed to fit snugly into the mouse port.

Leave a clear area approximately 12 inches (30 centimeters) square to the right or the left of the Amiga so that you have room to move the mouse freely. Use of a mouse pad helps keep the mouse from getting dirty and makes it respond better.

Before using the mouse, remove the packing material. Turn the mouse upside down and pull out the foam strip that holds the mouse ball in place.

Attaching a Monitor

The A1200 has three display outputs, allowing you to use any of several kinds of display devices:

- VIDEO port: analog RGB monitor (multiscan/15 KHz/VGA); television with SCART connection
- COMP. jack: composite monitor; television (using VCR video input)
- RF MODULATOR jack: NTSC television; PAL television

See the documentation for your monitor and any other graphics expansion hardware you may have for specific information about making the proper connections. Appendix A has more information on monitor compatibility. Your dealer can help you choose the right combination of graphics hardware, monitor, and monitor cable or adapter for your use.

After connecting your monitor, skip ahead to the section *"Connecting Power and Turning On the Amiga"* if you have no optional equipment to install. Power connection is always the final step.

RGB Monitors

An RGB monitor gives the highest quality picture, and allows you the widest selection of the Amiga's many display modes.

Several types of analog RGB monitors can be used with the A1200, including multiscan, 15 KHz, and VGA/SVGA monitors. A multiscan (multiple horizontal scan rate or "multisync") RGB monitor provides the greatest flexibility. A multiscan monitor is required if you wish to use display modes that have different horizontal scan rates.

A 15 KHz analog RGB monitor can display only the Amiga's default display mode and other 15 KHz scan rate modes. A VGA or SVGA type monitor can display the Amiga's de-interlaced and higher resolution modes, but not the standard 15 KHz video modes.

Connect a 15 KHz monitor with a 23-pin female connector, such as the Commodore 1084 or 1084S, directly to the A1200 VIDEO port. For a monitor such as a multiscan, VGA, or SVGA model that has a small 15-pin VGA-style connector, connect the 23-pin to 15-pin adapter included with the A1200 to the VIDEO port, then connect the monitor cable to the adapter.

With the proper adapter cable, a television with a SCART input can be used as a 15 KHz RGB monitor. See the *"SCART Televisions"* section below for more information.

Composite Monitors

Use a connector cable with a male RCA-type plug at one end and a plug compatible with your monitor input to connect a composite monitor. Plug the RCA end into the Amiga's composite output jack (labelled COMP.) and the other end into the composite input jack on the monitor.

You can also plug this end of the cable into a VCR that has a composite input (usually an RCA-type jack labeled VIDEO IN or EXTERNAL VIDEO). This allows you to record Amiga output onto video cassette and use a television connected to the VCR for the Amiga display.

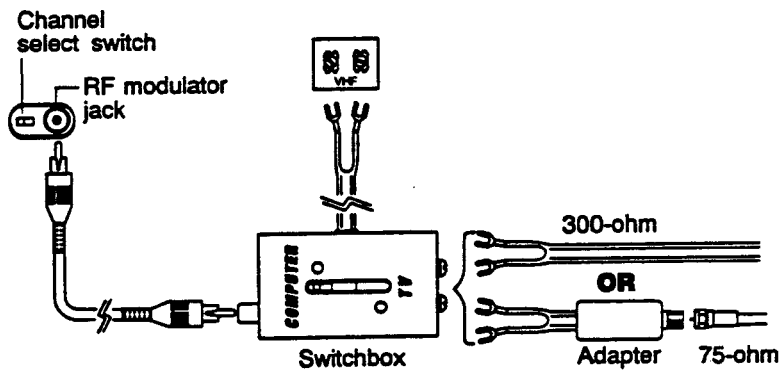
This method provides a higher quality picture than using the RF modulator output to connect to the VCR or television antenna inputs. However, only the standard 15 KHz display modes can be displayed this way. An RGB monitor is required to properly reproduce the Amiga's de-interlaced and higher resolution display modes.

NTSC Televisions

Connecting an NTSC television requires a computer/TV switch box and a connector cable with male RCA-type plugs at both ends. If your television reception is through a coaxial cable with a round "F" connector you also need a 75-ohm to 300-ohm adapter. These items are available from any department or electronics store.

If you have a VCR or television set with a composite video input (an RCA jack usually labeled VIDEO IN) you should use the composite output as described in the "*Composite Monitors*" section above. This is simpler and produces a better picture. If your TV or VCR has antenna inputs only, use the following procedure:

1. Disconnect the cable or VHF antenna wire from the TV or VCR.
2. For coaxial cable: connect the end of the cable to a 75-ohm to 300-ohm adapter.
3. Connect the VHF antenna or adapter leads to the CONNECT TO ANTENNA terminals on the switch box.
4. Connect the short twin-lead wire on the side of the switch box to the VHF terminals on the TV or VCR.
5. Plug one end of the connector cable into the RF MODULATOR jack on the Amiga.
6. Plug the other end of the connector cable into the COMPUTER jack on the switch box.



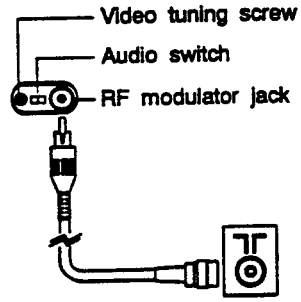
7. Set the Channel Select switch to the left for channel 3 or to the right for channel 4, whichever is not used in your geographical area.
8. Select the COMPUTER switch setting on the switch box.

Audio output from the Amiga will use the television's speaker(s). You may also connect the Amiga audio outputs as described in the *"Audio Connection"* section.

PAL Televisions

If you have a PAL VCR or television set with a SCART input, see the *"SCART Televisions"* section below. If your TV or VCR has a composite video input (a jack usually labeled VIDEO IN) you should use the COMP. output as described in the *"Composite Monitors"* section above. Either of these methods is simpler and produces a better picture than using the RF MODULATOR output.

Connecting a PAL television with only an antenna input requires a connector cable with a male RCA-type plug at one end and a standard 75-Ohm PAL connector at the other end. Use the following procedure:



1. Insert the PAL end of the connector cable in the 75-Ohm antenna jack on the TV.
2. Insert the RCA-type end of the cable in the RF MODULATOR jack on the Amiga.
3. Plug in and turn on the Amiga (see the section *"Connecting Power and Turning On the Amiga"*).
4. Turn on the TV and tune it to channel 36.
5. Use a small flat-blade screwdriver to turn the A1200 Video Tuning screw near the RF MODULATOR jack until the picture is clear and stable.
6. Run some software that produces sound, such as a game.
7. Set the PAL Audio switch to the left or right position, whichever gives the best sound.
8. Turn off the Amiga and disconnect it from power if you have any other equipment to connect.

Audio output from the Amiga will use the television's speaker(s). You may also connect the Amiga audio outputs as described in the *"Audio Connection"* section.

SCART Televisions

Use a SCART/RGB adapter cable to connect the Amiga to equipment with a SCART connector. Insert the 23-pin end of the cable into the VIDEO port on the Amiga and the RCA plugs into the left and right Amiga audio jacks. Insert the SCART connector on the other end of the cable into the connector on the equipment.

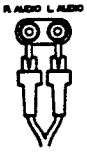
Audio output from the Amiga will use the television's speaker(s). You may also connect the Amiga audio outputs as described in the *"Audio Connection"* section.

Note — Since the definition of the SCART interface varies somewhat among TV manufacturers, consult an electronics or computer dealer to get the proper SCART adapter cable for your TV.

Connecting Optional Equipment

If you have tested your Amiga system after making the basic connections, turn it off before connecting any other items. Never attempt to connect or disconnect anything while the power is on.

Audio Connection



Two RCA jacks (female connectors) labeled R. AUDIO and L. AUDIO connect the Amiga's left and right sound channels to a monitor or audio equipment. You need to connect these to hear sound from your Amiga unless you are using an RF connection to a TV or VCR.

Audio Connection to a Stereo Monitor

A monitor with internal speakers allows you to hear the Amiga's sound output without other external equipment. An Amiga stereo monitor comes with a stereo cable, color-coded for the left and right channels. Insert the connectors at one end of the cable into the Amiga's left and right audio output jacks. Then insert the cable's other connectors into the corresponding audio input jacks on the monitor.

Audio Connection to a Monaural Monitor

A monitor with monaural sound capability can still accept both Amiga audio channels. Either use a "Y" adapter cable plugged into both Amiga audio jacks, or plug a single audio cable into either one of the jacks. Insert the other end of the cable into the monitor's audio input jack. Both audio channels will be routed to the monitor speaker.

Audio Connection to Other Equipment

If your monitor does not have speakers, you can connect the Amiga's audio output to separate powered speakers, a stereo system, or other audio equipment. Use input connectors labeled Auxiliary, Aux, Audio In, CD, Tape, VCR Audio, etc. on the equipment. You need a stereo audio cable with RCA connectors at one end and the appropriate type of connector for your equipment at the other end. Audio cables and adapters are available from most electronics and stereo stores.

Insert the RCA connectors into the Amiga's audio output jacks and the other connectors into the equipment's corresponding audio input jacks. Consult the equipment's user manual for further instructions on using its external inputs.

Attaching an External Floppy Drive

To attach an external 3.5-inch floppy drive to the Amiga, use the port labeled DISK DRIVE. The drive must be Amiga compatible, with a 23-pin male connector. This drive becomes device DF1:. A second external floppy drive attached to a pass-through connector on a DF1: drive would be device DF2:.

Attaching a Parallel Device

To attach a parallel device such as a Centronics compatible printer or a scanner to the Amiga, use the port labeled PARALLEL PORT. The cable you use must have a 25-pin male connector on the Amiga end and the appropriate type of connector for the parallel device on the other end.

Attaching a Serial Device

To attach a serial device, such as a modem, MIDI interface, or serial printer, use the port labeled SERIAL PORT. The cable you use must have a 25-pin female connector on the Amiga end and the appropriate type of connector for the serial device on the other end.

Attaching a Joystick

To attach a joystick, light pen, or other special controller, use the 9-pin port labeled GAME on the rear of the unit. The controller's connector must be female.

Note Refer to Appendix B for technical information on the external connectors.

Connecting Power and Turning On the Amiga

Caution **Do not plug in and turn on the Amiga until you have securely connected all equipment.**

When all other connections have been made, you can connect your system to power and turn it on.

1. Connect peripherals to power.
2. Plug in all peripheral equipment as described in the previous sections.
3. Attach the Amiga power cable.

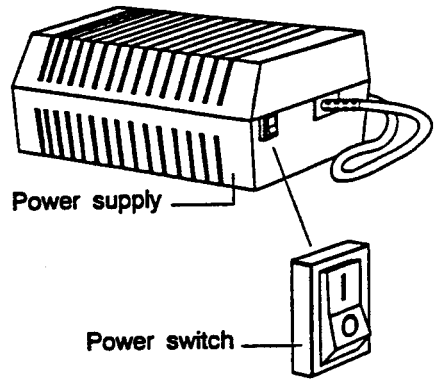
   In the United States and Canada the Amiga power cable has a square 5-pin male connector at one end, the power supply in the middle, and a standard 3-prong male power plug on the other end.

   Note Different countries may use other power cable designs. Be sure your Amiga matches the electrical voltage requirements in your country.

   Attach the male end to the connector labeled POWER on the rear of the A1200. The other end of the cable may then be inserted into a three-prong grounded AC outlet. The power switch is on the power supply.

   If in doubt about electrical hookup requirements consult your dealer.

4. Plug in the Amiga.
5. Turn on the other equipment.
6. Turn on the Amiga



Switch the power switch on the power supply to the on (I) position.

The Amiga will begin to boot. Chapter 2 contains information on booting the Amiga.

Chapter 2

Getting Started

This chapter covers booting your Amiga system for the first time, using the keyboard, and using keyboard mouse equivalents.

Booting Floppy-Based Systems

When an Amiga system is turned on, it looks for a bootable floppy disk in the internal floppy drive, DF0:. This disk can be a copy of your Workbench disk or a bootable application disk.

If a bootable disk is not found, a floppy-based Amiga (no hard drive) prompts you by showing a screen with a disk being inserted into a drive. When a bootable floppy disk is inserted into DF0:, the screen goes blank while the Amiga loads the system information it needs from the disk.

Booting from floppy takes about two minutes. When the process is complete, you should see a screen similar to that illustrated in Figure 2-1.

Booting Hard Disk-Based Systems

The Amiga can boot directly from a hard disk if your system has one. You do not need to insert any floppy disks. Hard disk users may boot from floppy, however, by inserting a bootable disk in DF0: before rebooting or turning the Amiga on.

Booting from hard disk generally takes about 30 seconds. When the process is complete, you should see a screen similar to that illustrated in Figure 2-1.

The Opening Screen

When the Amiga has finished booting, the Amiga Workbench screen is displayed (Figure 2-1). If you do not see a screen similar to this, the Amiga did not boot successfully and you should refer to Chapter 5, *"Help with System Problems."*

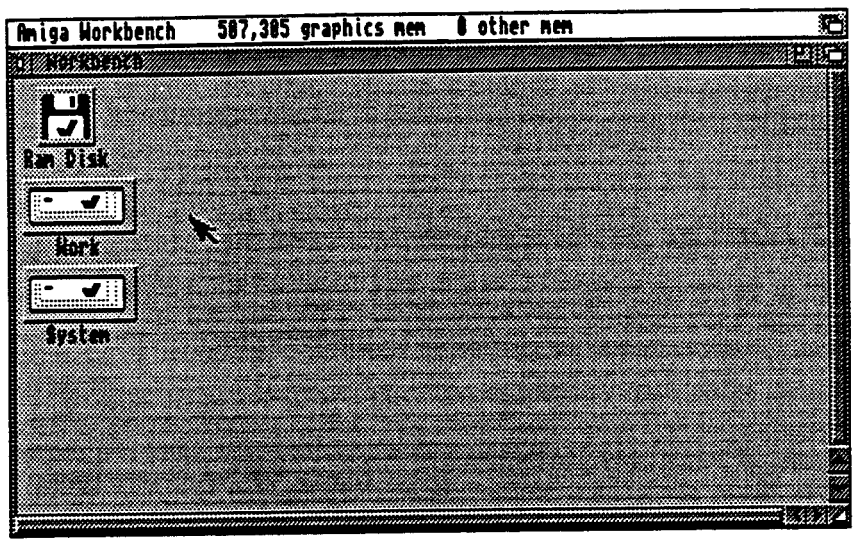


Figure 2-1. Workbench screen

With the Workbench screen displayed, you can set up the Workbench environment as it suits you and configure the system to take best advantage of your hardware setup.

See the *Workbench User's Guide* for complete information on:

- Booting and rebooting
- Installing and reinstalling the system software
- Setting the system up for your keyboard, language, and country
- Making backup copies of your system disks
- Using the Preferences editors

The rest of this guide assumes that you are familiar with basic Amiga operations and terminology.

Turning Off the Amiga

When you finish a computing session and want to turn off the Amiga:

1. Save to disk any work that you want to keep. Turning off or rebooting the Amiga erases whatever is in memory.

   Important: Do not turn off or reboot the Amiga while any disk activity is in progress! Wait at least 5 seconds after all disk drive activity lights have gone out before removing floppy disks or turning off the Amiga. Also, if you are using software that automatically saves to disk periodically or which allows remote access to the Amiga's disks through a network, exit the software or disable the network connection before powering off or rebooting.

2. Remove any disks from the floppy drive(s).
3. Switch the power switch on the side of the power supply to the off (O) position. The power light on the right front of the Amiga will go out.
4. Turn off the monitor and any peripherals.

Note If you want to turn the Amiga on again immediately, wait at least 30 seconds after turning the machine off before turning it on again.

The Amiga Keyboard

The Amiga keyboard is similar to industry-standard computer keyboards. It has four sections:

- The main keyboard
- The numeric keypad

- The function keys
- The Del, Help, and arrow keys

Figure 2-2 illustrates the keyboard.

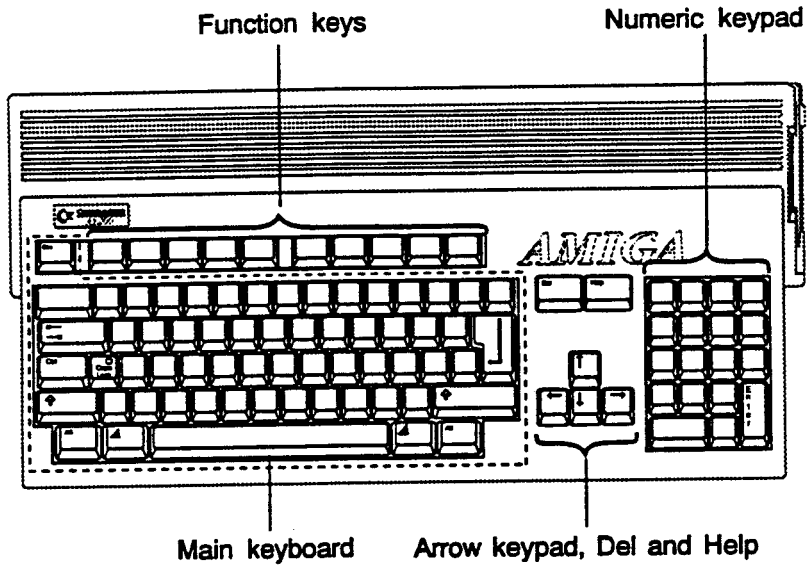


Figure 2-2. Amiga keyboard

Remember the following points when using the keyboard:

- The layout or "mapping" of characters to the keys is determined by the Preferences keymap setting. This typically varies by country.
- Keys can be redefined by an application to have special functions. If you notice unexpected responses to some keystrokes (especially when switching between windows and screens running different applications) this may be the reason. For specifics on how an application affects the keyboard, see the application's manual.
- Depending on the application, certain key combinations may have special meaning. The keys may need to be pressed simultaneously or one after the other.

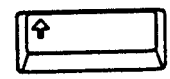
- Many keys on the keyboard repeat for as long as they are held down.
- You cannot interchange the numeral "0" and the uppercase letter "O," or the numeral "1" and the lowercase letter "l."

Note International keyboards have two additional keys on the main keyboard, located near the Shift key positions. The characters they produce depend on the current Preferences keymap selection.

The Main Keyboard Area

The main keyboard area has standard alphanumeric typewriter keys plus special keys with computer-specific uses. Some of these are "qualifier keys," which have no effect by themselves, but are used with other keys for special functions.

Qualifier keys include the following:



Shift Keys

Two Shift keys, marked with an up arrow (⇧) are located on either side of the bottom row of letters. These keys can be used the same way as the shift keys on a standard typewriter. Press either Shift key simultaneously with any alphabetic key or with any key having two characters on the keycap to produce the uppercase or top character. The Shift keys are also often used with other keys to perform special functions.

Alt Keys

The two Alt (Alternate) keys, located at the extreme left and right sides of the bottom row of the keyboard, are often used with other keys to perform special functions.

Ctrl

The Ctrl (Control) key, located on the left side of the middle row of letters, is a program-defined key that is often used with other keys to perform special functions.

Left Amiga

The left Amiga key, located on the bottom row of the keyboard just to the left of the space bar, is used with other keys to perform special functions, particularly keyboard shortcuts for gadget selection.

Right Amiga

The right Amiga key, located on the bottom row of the keyboard just to the right of the space bar, is used with other keys to perform special functions, particularly keyboard shortcuts for menu selection.

Caution **The key combination Ctrl+Left Amiga+Right Amiga reboots the Amiga. See Chapter 1 in the *Workbench User's Guide* for details.**

Other special keys include the following:

Return

The Return key, located on the right side of the main keyboard area in the middle two rows, transmits information or a command to the computer. This key is sometimes referred to by the symbol "↵" or as the Enter key.

Caps Lock

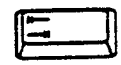
The Caps Lock key, located next to the Ctrl key, forces all alphabetic keys (A through Z) to produce uppercase (capital) letters. Other keys, however, are not affected by the Caps Lock key. To

type the upper characters on the nonalphabetic keys, you must still hold down one of the Shift keys and press the key for the desired character.

When Caps Lock is active, a light on the key is illuminated. To inactivate Caps Lock, press the key again so that its light goes out.

Esc

The Esc (Escape) key, located at the top left of the keyboard, is a program-defined key, often used as a shortcut to leave or enter a program or a certain program mode.



Tab

The Tab key, located on the left side of the top row of letters, can be program-defined to move the cursor to a set position. Tab is used extensively in word processing and desktop publishing programs. In addition, many Workbench programs that have several text gadgets let you use Tab and Shift+Tab to move from gadget to gadget.

Backspace

The Backspace key is the key farthest right in the top row of the main keyboard. Pressing Backspace deletes any characters to the left of the cursor and causes the cursor, and any characters to the right of it, to move to the left.

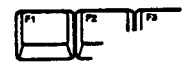
The Numeric Keypad

The numeric keypad is located to the far right of the keyboard. The keys are arranged in a calculator layout to facilitate numeric data entry. The numeric and arithmetic symbol keys on the keypad are equivalent to the numeric and arithmetic symbol keys on the main keyboard.

In many cases, you can use the Enter key on the numeric keypad just as you use the Return key on the main keyboard—that is, to

transmit data and commands to the computer. The keypad may be redefined for special functions by some applications.

Note — The legends on the front of many of the numeric keypad keys, such as PgDn and Home, are normally not applicable to Amiga programs. The indicated functions are available only when running MS-DOS on a PC emulator, or within certain PC-based applications.



The Function Keys

The function keys, located at the top of the keyboard and labeled F1 to F10, are programmable keys. Applications can define these keys to activate special functions or may allow you to define them.

The Del, Help, and Arrow Keys

Del

The Del (Delete) key, located just to the right of the top row of the main keyboard, deletes the character at the cursor position. Any characters to the right of the cursor move to the left.

Help

The Help key, located to the right of the Del key, is a program-defined key that applications can use to provide additional information or user assistance while a program is running.

The Arrow Keypad

The four arrow keys are grouped in a small keypad at the lower right side of the keyboard, between the main keyboard and the numeric keypad. These keys control the movement of the cursor (up, down, left, and right) on the screen. The direction in which each key moves the cursor is indicated by the direction of the

arrow on the key. These keys may also have special functions with different qualifier keys, depending on the application.

Keyboard Equivalents to the Mouse

You can use the keyboard in addition to or instead of the mouse to move around the screen and select icons, gadgets, and windows. In programs that mainly use the keyboard to enter information, this can be faster and more convenient.

The keyboard equivalents are especially useful if your mouse is malfunctioning, or when you need to make extremely precise pointer movements.

The following key combinations are available from any application, to let you perform mouse movement and button presses with the keyboard.

Move left	either Amiga key+left arrow
Move right	either Amiga key+right arrow
Move up	either Amiga key+up arrow
Move down	either Amiga key+down arrow
Left mouse button	Left Alt+left Amiga
Right mouse button	Right Alt+right Amiga

Note In the arrow key combinations in this table, pressing Shift at the same time as the other two keys makes the pointer move faster.

Chapter 3

Before Expanding Your System

This chapter summarizes the expansion options for the Amiga other than peripherals connected to the rear panel ports. In all cases, see the installation manual for the option you are installing for detailed information on how to install it.

The A1200 can accommodate several types of expansion options:

- Memory expansion
- Drive expansion
- CPU expansion
- PCMCIA expansion

Memory Expansion

The amount of random access memory (RAM) in the A1200 is expandable to 10 megabytes (10 MB). All RAM automatically configures and is directly addressable by the operating system.

The Amiga's memory consists of Chip RAM and Fast RAM. Chip RAM is memory shared by the microprocessor and the Amiga's custom chips. Fast RAM is memory used exclusively by the processor. The A1200 can use up to 2 MB of Chip RAM and 8 MB of Fast RAM.

Chip RAM on 1 MB machines can be expanded to 2 MB of 32-bit memory with an internal expansion module. (This expansion module can also contain a battery-backed clock/calendar.)

Up to 4 MB of 32-bit Fast RAM can be added using the CPU slot. (A CPU slot board containing its own microprocessor, such as a 68030 accelerator, could contain more than 4 MB of Fast RAM.) An additional 4 MB of 16-bit memory can be added using the PCMCIA memory card slot.

Drive Expansion

The A1200 can accommodate a 2.5-inch hard drive internally. The A1200 contains a built-in Intelligent Drive Electronics (IDE) hard disk controller, to which the hard drive may be connected.

External storage devices such as a CD-ROM, tape, or hard drives may be added using the PCMCIA slot. (An external drive may require a controller, such as a SCSI adapter, in addition to the drive itself.)

CPU Expansion

The 150-pin CPU slot accessible through the door in the bottom of the A1200 can accommodate various types of expansion. This can include accelerator boards, additional RAM, PC emulators, and other options that must have direct access to the Amiga's internal hardware.

PCMCIA Expansion

The PCMCIA "credit card" slot is a standard, general purpose expansion connector. It allows you to use a wide range of expansion options, such as additional system RAM, modems, ROM card applications, networking hardware, SCSI adapters, and so on as they become available for compact computers from various manufacturers. These options can be connected and disconnected easily, without the need to open the computer. Only one PCMCIA expansion item at a time can be used.

The next chapter contains details on PCMCIA expansion.

When Installing Internal Options

This section gives general information related to installing Amiga expansion options.

Warning

Turn off and unplug the Amiga before you install any internal expansion device. Disconnect all cables for external peripherals from the Amiga.

Installation of internal options should be performed by an authorized Commodore dealer/service center or by a knowledgeable technician. Commodore will not be liable for any damages or injuries caused by improper installation of expansion equipment.

Installing an option always includes:

1. Turning off the Amiga and disconnecting it from the AC power outlet.
2. Disconnecting the mouse and all other external peripherals.
3. Following the expansion device manufacturer's specific installation instructions.
4. Reconnecting peripherals and power, performing any software installation or configuration that may be necessary, and testing the device for proper operation.

Note

Because optional items can occasionally have unforeseen interactions, Commodore strongly recommends that new expansion devices be tested first without any other expansion devices connected. If you experience problems after installing any device, try removing any other optional items from the system, and test the new item by itself, then in various combinations with other items. Often a solution to the problem can be found when the interacting items are identified.

ESD Precautions

Integrated circuit (IC) chips are sensitive to static electricity. When handling electronic components containing IC chips, including expansion boards and RAM modules, always take precautions to reduce the chances of electrostatic discharge (ESD) harming the components.

Touching a nearby grounded metal surface before touching a component drains static electricity, reducing the likelihood of ESD damage.

Chapter 4

Using PCMCIA Cards

The card slot in the left side of the A1200 accepts a standard 68-pin memory or accessory card that complies with the PCMCIA 2.0 specification.

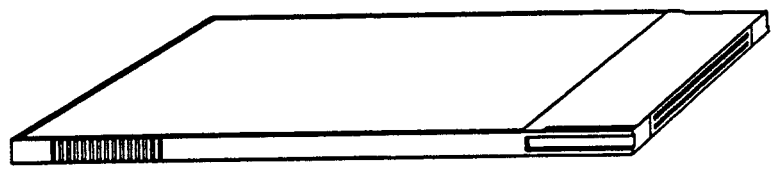


Figure 4-1. Typical PCMCIA card

Although any PCMCIA 2.0 compliant products should work properly together, some cards and accessories may be designed with a particular type of computer in mind. You should check with your Amiga dealer to help you determine whether a certain item will work as expected.

Inserting and Removing Card Slot Devices

To use a memory card or a card slot accessory, insert the edge of the connector that has the row of small holes into the slot in the left side of the Amiga, as illustrated in Figure 4-2. A memory card's label should be facing up. Only about 1 inch/3 cm of the card or accessory connector enters the slot. Insert it firmly, but do not use excessive force—it does not click into place.

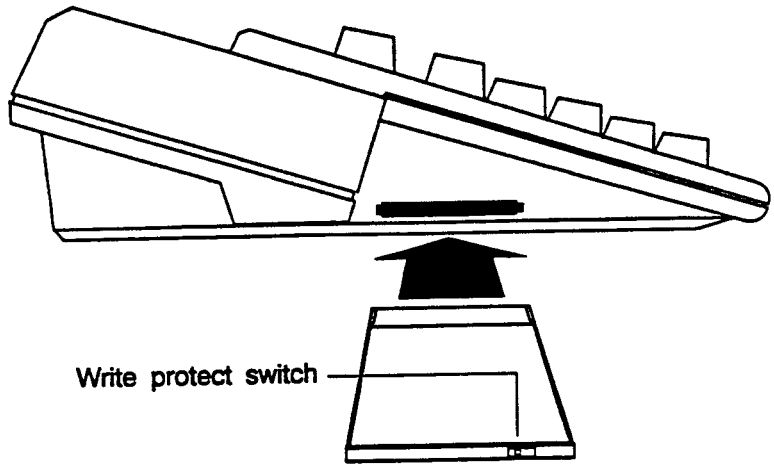


Figure 4-2. Inserting PCMCIA card

Unlike with other types of expansion devices, the A1200 allows the safe insertion and removal of cards while it is turned on. While such "live" insertion and removal should not cause physical damage, some caution must be taken. Removing a card or card slot accessory that is in use will interrupt its operation and almost certainly will produce undesired or unexpected results, as noted in this chapter's final section.

Memory Cards

Memory cards can function as expansion RAM or as disk-like storage devices. You use the PrepCard utility, described in Chapter 10 of the *Workbench User's Guide*, to prepare memory cards for use either as RAM or as a "card disk."

Write-Protection

Like floppy disks, memory cards can be write-protected. There is a small switch on the edge of the card opposite the end that goes into

the slot. You can use the point of a pen or a similar implement to move the switch back and forth to write-protect or write-enable it.

Card Battery

Static RAM (SRAM) memory cards have a small battery to allow the card to retain the data stored in the card's memory chips after it has been removed. The batteries are long-lasting, but must eventually be replaced when they run down for the card to continue functioning.

Cards Prepared as RAM

When prepared as system RAM, the card memory is added to the other memory in the Amiga, just as if additional memory were installed internally. Cards are available in many sizes, from 64 KB to over a megabyte. A maximum of 4 MB of RAM may be added using the card slot.

A memory card must be write-enabled and inserted before you boot or reboot for its memory to be added to the Amiga's RAM. Card memory is added to Fast memory. The total number of bytes of available Fast RAM is shown in the Workbench screen title bar as "other mem".

Cards Prepared as Disk

A card disk is used much as a floppy disk is used: you can read from and write to the card as you normally do, from applications, the Workbench, or the Shell. The contents of the card remain even when you remove the card or turn off the Amiga. Read and write operations using memory cards are very fast.

You can insert and remove the card while the Amiga is turned on. However, wait a few seconds after attempting any card disk access before you remove the card, to be sure the disk activity has finished.

ROM Applications

Games or other applications may be available on PCMCIA ROM cards. To be usable on the A1200, the application must be written specifically for the Amiga. A PCMCIA ROM application may "take over" the Amiga, preventing multitasking (running the Workbench, or other applications). See the ROM card's documentation for more information.

Other Devices

Accessories, such as modems or network adapters having a PCMCIA connector, can also be attached with the card slot. Directions on use of these items will be included with the device.

Notes on Insertion and Removal

- Only one memory card or accessory may be inserted at a time.
- Removing a ROM application card or a memory card that is currently in use as RAM immediately reboots the Amiga.
- Do not write-protect a memory card while it is in use as RAM—this causes the Amiga to lock up, requiring you to reboot.
- Do not remove a card disk immediately after attempting an open or save operation on it.
- Removing an accessory such as a modem or network adapter while it is operating immediately breaks its communication connection.
- Removing an accessory, such as a SCSI adapter, that connects to storage devices while it is operating may cause a disk error, damaging files or directory structures on the associated storage devices.

Chapter 5

Help With System Problems

If you have a problem with your Amiga or experience unexpected results, there may be an easy solution. Many problems result from simple errors in setting up the system or installing expansion devices.

Caution **Commodore will not be held liable for damages or injuries resulting from improper installation or repairs attempted by unauthorized personnel.**

Although you can solve many problems yourself, others result from hardware failure and require the assistance of your Commodore dealer/service center or a knowledgeable technician. Never attempt to repair any problem involving internal damage to the Amiga yourself.

Avoiding Problems

The three most important rules to remember to prevent damage to your computer, files, and disks are:

1. Never connect or disconnect anything while the power is on!

   This applies to internal and external connectors other than the PCMCIA slot, including the mouse and game controllers. It is very easy to cause damage that requires a service call by connecting or disconnecting something without first turning the system off.

2. Never interrupt disk activity!

   This applies to floppy disks, hard disks, and PCMCIA card disks. When floppy or hard disk activity is in progress, the drive activity light on the top of the computer is lit. (There is no drive activity light for a card disk.) Interrupting disk activity (by removing a disk from its drive, rebooting, or powering off) can cause disk errors. Always wait a few seconds after the drive activity lights seem to have stopped, to be sure all disk activity has finished.

3. Read the documentation!

   The vast majority of problems can be avoided by carefully reading and following the instructions for the hardware and software you use.

Identifying and Solving Problems

There are several general types of problems that can appear when you use your system:

- Software problems
- Startup problems
- Disk problems
- Installation and maintenance problems

Software Problems

This chapter focuses on hardware problems and their possible solutions. For information on software-related problems, consult your Amiga software documentation.

Typical software problems include:

- Preferences settings for your language, country, and national keyboard type (keymap) have not been made yet.
- Preferences settings do not match your peripheral hardware, such as modem or printer.
- New software was improperly installed.

- Necessary directories or files are missing from the boot volume.
- Necessary directory assignments have not been made.
- The standard Startup-sequence file has been altered.
- There is a disk error.

Problems of this type usually produce requesters or error messages that give some indication of the source of the trouble. Note this information and consult your Amiga software documentation for guidance. The *Workbench User's Guide* and the *Amiga Hard Drive User's Guide* have information about software installation, proper Preferences settings, and the use of programs that can help with disk problems.

Startup Problems

Problems starting up the system from a power-off state are the most common sources of confusion for new users. This most often results from simple mistakes in setting up the system. Actual hardware failure is a less frequent cause.

Check the following if your Amiga does not respond when you turn it on:

- Is the Amiga plugged in to a power source of the correct voltage?
- Is the monitor plugged in to a power source of the correct voltage?
- Is the monitor connected to the Amiga?
- Are both the monitor and the Amiga turned on?
- If the Amiga is plugged in to a multiple-outlet power strip, is the power strip plugged in, turned on, and working properly?
- Are the monitor and the monitor cable known to work correctly?
- Is the monitor of a type capable of displaying the Amiga's video output?
- Is the monitor set to accept the Amiga's default video mode?
- Is the monitor securely connected to the main unit?

For information on these basic setup questions, refer to the *"About Electrical Requirements"*, *"Connecting Power and Turning On the Amiga"*, and *"Attaching the Monitor"* sections of Chapter 1. Also see

the ScreenMode sections in the *Workbench User's Guide,* and your monitor manual.

Disk Problems

Notes on Floppy-Based Systems

If the Amiga comes on, but does not boot, check the following before suspecting a hardware problem:

- Did you insert a copy of your Workbench disk when prompted by the initial animated sequence?
- Did you insert the floppy properly into the drive?
- Is the Workbench disk you inserted an exact copy of your original Workbench disk, or a disk you know to be bootable?

If the Amiga will not boot from a given disk, try others that you know to be bootable. You should always keep your original, unmodified Workbench disk available in case of such a problem.

If the Amiga will not boot from any floppy, even those you know to be good, then it is probable that the floppy drive or the computer itself has some hardware problem.

Notes on Hard Disk Systems

If the Amiga comes on, but does not boot, check the following before suspecting a hardware problem:

- Do you have a bootable hard drive partition in the system?
- Is the partition you want to boot from enabled, and does it have a boot priority above other bootable devices or partitions?
- Does your bootable partition have all the required directories and files available on it?

If you have trouble booting from your hard disk, try booting from floppy. If you can boot from floppy, then your hard disk setup, or something on your hard disk, probably is the source of the trouble. After booting from floppy you may still be able to access your hard disk to try to determine the source of the trouble.

Typical disk drive hardware problems include:

- A drive ribbon cable connector is inserted in its drive or motherboard connector(s) improperly.
- A drive is not connected to power, or the power supply is overloaded.
- A drive ID or unit number jumper is set incorrectly.
- A drive controller is not fully seated in its slot.
- The device chain is not terminated correctly (SCSI drive systems).
- A hard drive takes too long to spin up to working speed.
- A drive or controller has the wrong ROM version.
- A drive ribbon cable is faulty.
- A drive is faulty.

For solutions to these problems, also check:

- Sections on disk use in the *Workbench User's Guide*
- The *Amiga Hard Drive User's Guide*
- The drive's user manual

Installation and Maintenance Problems

Installation problems are most likely to appear after you have added a new drive or other hardware item to the system. If you have a problem after installing additional hardware, remove the new item and see if the problem disappears. If it does, you know the problem is in that item or its installation. Repeat the installation, following the hardware manufacturer's installation instructions carefully.

If you have several expansion devices, the problem may be an interaction between two or more items that by themselves work properly. Try running your system with different combinations of expansion devices to isolate the offending items. If the item requires its own software, consider different settings the software may offer.

Installation Problems

If the fault is not in the new hardware itself, there may be a problem with its installation. Check to be sure that:

- A board installed in the CPU slot is fully seated in the slot.
- An accessory installed in the PCMCIA slot is fully seated in the slot.
- A PCMCIA memory card is write-enabled when it needs to be.
- All jumpers are set properly according to the documentation.
- All peripherals were properly reconnected to the Amiga after installation.

Maintenance Problems

- A floppy, removable media, or CD-ROM drive is dirty or out of alignment. Use a commercial cleaning product according to the drive manufacturer's directions, or have your dealer/service center adjust the drive.
- The mouse ball or mouse ball rollers are dirty. Open the mouse ball cavity, remove the ball, and clean the ball and interior with a cotton swab.
- Connector pins are bent or dirty. Carefully clean and straighten the pins.

Non User-Serviceable Problems

If you still have a problem after trying the remedies suggested here, you may have a hardware problem that requires professional attention. Have your Amiga examined by your Amiga dealer/service center or a knowledgeable technician. If the problem appears to be with a third-party device, contact its manufacturer.

Do not try to repair a damaged or malfunctioning unit yourself. This could cause further damage, possible injury, and the voiding of your warranties.

Appendix A

Technical Specifications

Clock Speed	NTSC: 14.32 MHz PAL: 14.19 MHz
Processor	Surface-mount Motorola 68EC020 microprocessor Optional surface-mount Motorola 68881/68882 Floating Point Unit (factory-installed only)
Custom Chips	AA multichip coprocessor system (Alice, Lisa, Paula) for video, graphics, sound, and DMA
Fast Memory	Expandable to 4 MB of 32-bit RAM in CPU slot, additional 4 MB of 16-bit RAM in PCMCIA card slot
Chip Memory	1 MB or 2 MB of 32-bit RAM; second megabyte on motherboard or on internal expansion module
ROM	512 KB
External Interfaces	Mouse / Joystick (DB9 male, two) Serial (DB25 male, RS-232, PC-compatible) Parallel (DB25 female, Centronics-compatible) Floppy (DB23 female, standard Amiga) Memory card (standard 68-pin PCMCIA 2.0) RGB (DB23 male, analog RGB / digital RGBI / SCART) Color composite video (RCA, NTSC / PAL) RF modulator (RCA, NTSC / PAL) Stereo audio (RCA, two)

Internal Interfaces	AT IDE (40-pin header) CPU local bus (150-pin edge)
Keyboard	Integral, 96 keys; international (configurable keymap)
Internal Disk Drives	One internal 3.5-inch floppy drive standard (880 KB formatted maximum) Mounting provisions for one 2.5-inch AT IDE hard drive
External Disk Drives	Up to two compatible floppy drives Additional drives possible as PCMCIA accessories
Video Display	**Output type:** RGB, analog and digital; color composite; RF modulated; interlaced and non-interlaced; up to 8 bitplanes **Compliance:** NTSC and PAL **Color palette:** 16.8 million **Horizontal scan rates:*** 15.6 KHz to 31.4 KHz **Vertical scan rates:*** 50 Hz to 73 Hz
Sound	4 independent voices configured as two stereo channels
Clock/calendar	Optional, with battery backup
Power Supply	23 watts, switching
Environmental Specification	Operating: 0 - 45°C (32 - 113°F) Storage/Shipping: 0 - 60°C (32 - 140°F)

*See the Mode Properties display in the ScreenMode Preferences editor for a given display mode's exact scan rates. Compare the scan rates of modes you wish to use and your monitor specifications to help determine monitor compatibility.

Appendix B

Input/Output Connector Pin Assignments

This section lists pin assignments (pinouts) for input/output connectors on the Amiga. The information in this section is technical and is intended only for those with special needs in connecting external devices to the Amiga. You should not need this information if you use cables designed specifically for the Amiga and the peripheral you want to connect.

Caution **Some pins on Amiga connectors provide power outputs and non-standard signals. Attempting to use cables not wired specifically for the Amiga may damage the Amiga or the equipment you connect.**

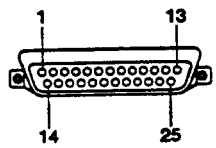
The descriptions that follow include specific warnings for each connector. For more information about connecting peripherals, consult your Amiga dealer or service center.

Note In the descriptions that follow, a forward slash in front of the signal name (for example, /STROBE) indicates a signal that is active low.

The I/O (Input/Output) column lists signal types: I for Input, O for Output, OC for Open Collector.

SERIAL Port

Connector type: DB25 male



In the following table, column two gives the Amiga pin assignments. Columns three and four give pin assignments for other commonly used connections; the information in these two columns is given for comparison only.

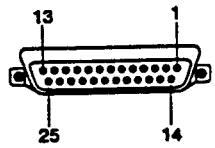
Caution **Pins 9 and 10 on the Amiga serial connector are used for external power. Connect these pins ONLY if power from them is required by the external device. The table lists the power provided by each of these pins.**

Pin 7 is the system ground. Do not connect this to shield ground on Pin 1.

Pin	Amiga	RS232	HAYES	I/O	Description
1	SHIELD	GND	GND	--	Shield Ground
2	TXD	TXD	TXD	O	Transmit Data
3	RXD	RXD	RXD	I	Receive Data
4	RTS	RTS	--	O	Request to Send
5	CTS	CTS	CTS	I	Clear to Send
6	DSR	DSR	DSR	I	Data Set Ready
7	GND	GND	GND	--	System Ground
8	CD	CD	DCD	I	Carrier Detect
9	+12V	--	--	--	+12 Volts DC (20 mA maximum)
10	-12V	--	--	--	-12 Volts DC (20 mA maximum)
11	AUDO	--	--	O	Amiga Audio out (Left)
12	n/c	S.SD	SI	--	Speed Indicate
13	n/c	S.CTS	--	--	
14	n/c	S.TXD	--	--	
15	n/c	TXC	--	--	
16	n/c	S.RXD	--	--	
17	n/c	RXC	--	--	
18	AUDI	--	--	I	Amiga Audio In (Right)
19	n/c	S.RTS	--	--	
20	DTR	DTR	DTR	O	Data Terminal Ready
21	n/c	SQD	--	--	
22	RI	RI	RI	I	Ring Indicator
23	n/c	SS	--	--	
24	n/c	TXC1	--	--	
25	n/c	--	--	--	

PARALLEL Port

Connector type: DB25 female



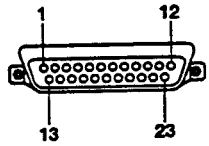
Caution **Pin 14 on the Amiga parallel connector supplies +5 volts of power. Connect this pin ONLY if the power from it is required by the external device. NEVER connect this pin to an output of an external device or to a signal ground.**

Pins 17-25 are for grounding signals. DO NOT connect these pins directly to a shield ground.

Pin	Name	I/O	Description
1	/STROBE	O	Strobe
2	D0	I/O	Data Bit 0 (LSB)
3	D1	I/O	Data Bit 1
4	D2	I/O	Data Bit 2
5	D3	I/O	Data Bit 3
6	D4	I/O	Data Bit 4
7	D5	I/O	Data Bit 5
8	D6	I/O	Data Bit 6
9	D7	I/O	Data Bit 7 (MSB)
10	/ACK	I	Acknowledge
11	BUSY	I/O	Busy
12	POUT	I/O	Paper Out
13	SEL	I/O	Select
14	+5V PULLUP	--	+5 Volts DC (10 mA)
15	n/c	--	
16	/RESET	O	Reset
17	GND	--	Signal Ground
18	GND	--	Signal Ground
19	GND	--	Signal Ground
20	GND	--	Signal Ground
21	GND	--	Signal Ground
22	GND	--	Signal Ground
23	GND	--	Signal Ground
24	GND	--	Signal Ground
25	GND	--	Signal Ground

VIDEO Port

Connector type: DB23 male



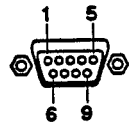
Caution **Pins 21, 22 and 23 on the RGB monitor connector are used for external power. Connect these pins ONLY if power from them is required by the external device.**

Pins 16-20 are used for signal ground. DO NOT connect these to Pin 13.

Pin	Name	I/O	Description
1	/XCLK	I	External Clock
2	/XCLKEN	I	External Clock Enable (47 Ohm)
3	RED	O	Analog Red (75 Ohm)
4	GREEN	O	Analog Green (75 Ohm)
5	BLUE	O	Analog Blue (75 Ohm)
6	DI	O	Digital Intensity (47 Ohm)
7	DB	O	Digital Blue (47 Ohm)
8	DG	O	Digital Green (47 Ohm)
9	DR	O	Digital Red (47 Ohm)
10	/CSYNC	O	Composite Sync (47 Ohm)
11	/HSYNC	O	Horizontal Sync (47 Ohm)
12	/VSYNC	O	Vertical Sync (47 Ohm)
13	GNDRTN	--	Return for /XCLKEN (e.g. digital ground)
14	/PIXELSW	O	Genlock overlay (47 Ohm)
15	/C1	O	Clock Out (47 Ohm)
16	GND	--	Video ground
17	GND	--	Video ground
18	GND	--	Video ground
19	GND	--	Video ground
20	GND	--	Video ground
21	-12V	--	-12 Volts DC (10 mA)
22	+12V	--	+12 Volts DC (100 mA)
23	+5V	--	+5 Volts DC (100 mA)

MOUSE Ports

Connector type: DB9 male



To use a mouse to control the Workbench, you must attach it to the MOUSE port (connector 1). You can attach joysticks, light pens, and other controllers to either of the connectors.

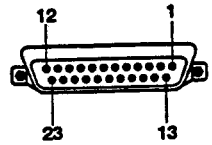
Caution **Pin 7 on both connectors supplies +5 Volts DC (50 mA). Connect this pin ONLY if power from it is required by the external device.**

Pin	Mouse / Trackball	Light Pen	Digital Joystick	Proportional Joystick	I/O
1	V-pulse	n/c	/Forward	Button 3*	I
2	H-pulse	n/c	/Back	n/c	I
3	VQ-pulse	n/c	/Left	Button 1	I
4	HQ-pulse	n/c	/Right	Button 2	I
5	Button 3 (M)*	Pen Press	n/c	PotX	I**
6	Button 1 (L)	/Beam Trigger	/Button 1	n/c	I**
7	+5V	+5V	+5V	+5V	—
8	GND	GND	GND	GND	—
9	Button 2 (R)	Button 2*	Button 2*	PotY	I**

*These buttons are optional.
**These pins may also be configured as outputs.

DISK DRIVE (floppy) Port

Connector type: DB23 female (external)



Pin	Name	I/O	Description
1	/RDY	I/O	Disk Ready
2	/DKRD	I	Disk Read Data
3-7	GND	--	Ground
8	/MTRXD	OC*	Disk Motor Control
9	/SEL2	OC*	Select Drive 2
10	/DRES	OC*	Disk Reset
11	/CHNG	I/O	Disk Removed From Drive--Latched Low
12	+5V	--	+5 Volts DC (250 mA maximum)
13	/SIDE	O	Select Disk Side--0=Upper, 1=Lower
14	/WPRO	I/O	Disk Is Write Protected
15	/TK0	I/O	Drive Head Position Over Track 0
16	/DKWE	OC*	Disk Write Enable
17	/DKWD	OC*	Disk Write Data
18	/STEP	OC*	Step The Head--Pulse, First Low, Then High
19	DIR	OC*	Select Head Direction--0=Inner, 1=Outer
20	/SEL3	OC*	Select Drive 3
21	/SEL1	OC*	Select Drive 1
22	/INDEX	I/O	Disk Index Pulse
23	+12V	--	+12 Volts DC (160 mA max.)

*OC=open collector

CPU Slot

Connector type: 150-pin male edge

Pin	Name	Pin	Name	Pin	Name	Pin	Name
1	reserved	21	A15	41	D31	61	D15
2	reserved	22	A14	42	D30	62	D14
3	reserved	23	A13	43	D29	63	D13
4	reserved	24	A12	44	D28	64	D12
5	reserved	25	A11	45	D27	65	D11
6	reserved	26	A10	46	D26	66	D10
7	reserved	27	A9	47	D25	67	D9
8	reserved	28	A8	48	D24	68	D8
9	GND	29	GND	49	GND	69	GND
10	+5VDC	30	+5VDC	50	+5VDC	70	+5VDC
11	A23	31	A7	51	D23	71	D7
12	A22	32	A6	52	D22	72	D6
13	A21	33	A5	53	D21	73	D5
14	A20	34	A4	54	D20	74	D4
15	A19	35	A3	55	D19	75	D3
16	A18	36	A2	56	D18	76	D2
17	A17	37	A1	57	D17	77	D1
18	A16	38	A0	58	D16	78	D0
19	GND	39	GND	59	GND	79	GND
20	+5VDC	40	+5VDC	60	+5VDC	80	+5VDC

Pin	Name	Pin	Name	Pin	Name
81	/IPL2	106	/RMC	131	/OE
82	/IPL1	107	reserved	132	/WE
83	/IPL0	108	reserved	133	/OVR
84	reserved	109	reserved	134	XRDY
85	/RST	110	reserved	135	/ZORRO
86	/HLT	111	/BR	136	/WIDE
87	reserved	112	/BG	137	/INT2
88	reserved	113	reserved	138	/INT6
89	SIZE1	114	/BOSS	139	GND
90	SIZE0	115	/FPUCS	140	+5VDC
91	/AS	116	/FPUSENSE	141	SYSTEM1 (GND)
92	/DS	117	CCKA	142	SYSTEM0 (GND)
93	R/W	118	/RESET	143	/xRxD
94	/BERR	119	GND	144	/xTxD
95	reserved	120	+5VDC	145	/CONFIG OUT
96	/AVEC	121	/NETCS	146	AUDIO GND
97	/DSACK1	122	/SPARECS	147	AUDIO LEFT
98	/DSACK2	123	/RTCCS	148	AUDIO RIGHT
99	CPUCLKA	124	/FLASH	149	+12VDC
100	E Clock	125	/REG	150	-12VDC
101	GND	126	/CCENA		
102	+5VDC	127	/WAIT		
103	FC2	128	/KBRESET		
104	FC1	129	/IORD		
105	FC0	130	/IOWR		

Appendix C

Using Floppy Disks

Floppy disks are a type of portable magnetic recording media that is used to:

- transfer information from one computer to another.
- install software on a system's hard drive.
- make backup copies of your software and data.

When you insert a floppy disk into the system's floppy disk drive, you can read the information stored on the disk and write information to the disk.

Using 3.5-Inch Floppy Disks

Your computer system comes with a 3.5-inch disk drive installed. This drive accepts standard double-density (880 KB storage capacity) floppy disks.

Figure C-1 illustrates a floppy disk. Double-density disks have a write-protect tab in one corner.

To write-protect a disk, slide the plastic write-protect tab to uncover the hole.

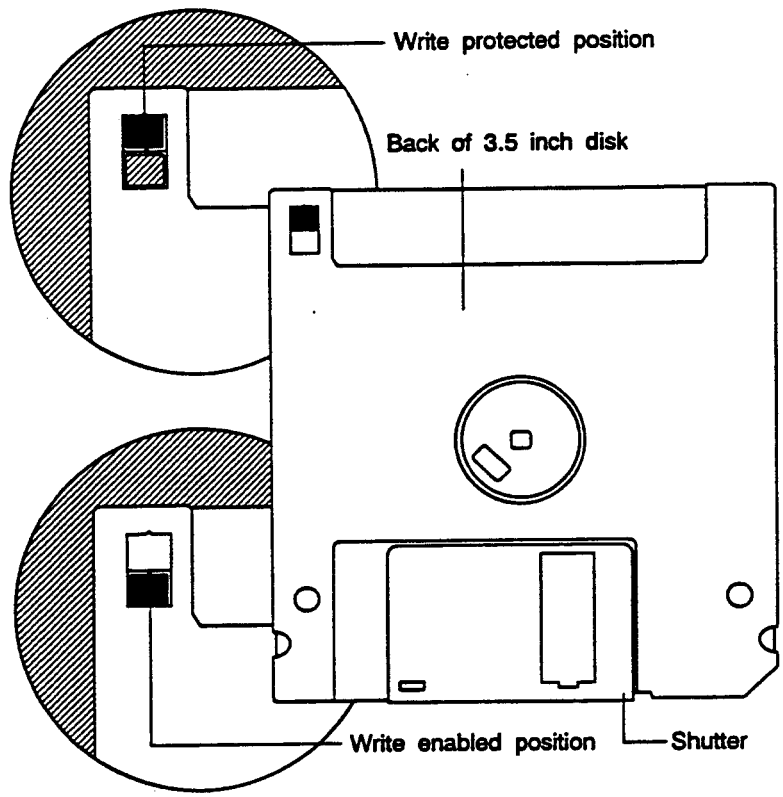


Figure C-1. 3.5-Inch floppy disk

Figure C-2 illustrates inserting a disk into the disk drive. When you push the disk all the way into the drive, the disk will click down into place. To release the disk, push the disk eject button on the lower right side of the disk opening.

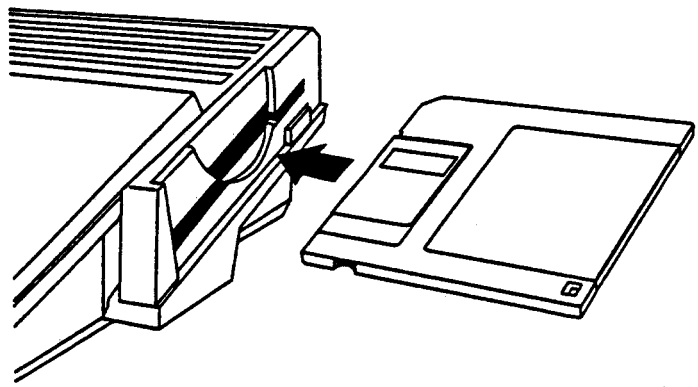


Figure C-2. Inserting a floppy disk

Guidelines for Using Disks

- Most important: Never remove a disk from a drive while the drive is in use. Always wait a few seconds after the drive light has gone out before removing it, rebooting, or turning the computer off, as sometimes there is some additional disk activity after a moment.

  Disk errors may be caused by interrupting disk activity. These can often be repaired using a disk recovery utility. See your Amiga software documentation for more information.

- Make copies (working disks) of important disks. Work with the copies and keep the originals in a safe place for use as backups if the copies become damaged. See your Amiga software documentation for information on copying disks.
- Don't touch or scratch any exposed portion of the disk's shiny surface, or allow dust or moisture to collect on the disk.
- Store disks at a temperature range between 50° and 120° F.
- Keep disks away from devices with strong magnetic fields, such as televisions, electric motors, speakers, etc.

- You must format a new disk before you use it for storing data. Before you begin the format, make sure the disk doesn't contain anything you want to save. Formatting a disk will erase all data stored on it.

Floppy disks may be formatted with the original Amiga file system (OFS), the Fast File System (FFS), or the MS-DOS compatible CrossDOS file system. You can also format disks (OFS and FFS only) with a directory-caching option for faster response in opening disk windows and reading disk directories. This option slightly decreases the amount of space on the disk.

You therefore have the following options in formatting disks in the Amiga's floppy drive.

Table C-1. Floppy formatting options

Amiga File System	Approximate Formatted Capacity
OFS	837 KB
FFS	879 KB
DC-OFS	837 KB
DC-FFS	879 KB
CrossDOS	720 KB

Note

Disks formatted with the directory-caching option cannot be read by Amigas with earlier versions of the system software. Do not format a disk with the directory-caching option if you need to use the disk to transfer files to an Amiga with Release 2 or earlier system software.

Also, you should not attempt to use standard disk repair utilities on such disks. Disk utilities not developed with the directory-caching feature in mind will not properly recognize the new disk format and could damage the data on the disks.

Appendix D
Amiga Character Set

The Amiga uses the ECMA-94 Latin 1 International 8-bit character set. The following tables list the printable characters in the lower and upper portions of the character set, by character code.

Table D-1. Amiga Character Set (lower)

Code	Code	Code	Code	Code	Code
32 sp	48 0	64 @	80 P	96 `	112 p
33 !	49 1	65 A	81 Q	97 a	113 q
34 "	50 2	66 B	82 R	98 b	114 r
35 #	51 3	67 C	83 S	99 c	115 s
36 $	52 4	68 D	84 T	100 d	116 t
37 %	53 5	69 E	85 U	101 e	117 u
38 &	54 6	70 F	86 V	102 f	118 v
39 '	55 7	71 G	87 W	103 g	119 w
40 (	56 8	72 H	88 X	104 h	120 x
41)	57 9	73 I	89 Y	105 i	121 y
42 *	58 :	74 J	90 Z	106 j	122 z
43 +	59 ;	75 K	91 [	107 k	123 {
44 ,	60 <	76 L	92 \	108 l	124 |
45 -	61 =	77 M	93]	109 m	125 }
46 .	62 >	78 N	94 ^	110 n	126 ~
47 /	63 ?	79 O	95 _	111 o	

Table D-2. Amiga Character Set (upper)

Code	Code	Code	Code	Code	Code
160 sp	176 °	192 À	208 Ð	224 à	240 ð
161 ¡	177 ±	193 Á	209 Ñ	225 á	241 ñ
162 ¢	178 ²	194 Â	210 Ò	226 â	242 ò
163 £	179 ³	195 Ã	211 Ó	227 ã	243 ó
164 ¤	180 ´	196 Ä	212 Ô	228 ä	244 ô
165 ¥	181 µ	197 Å	213 Õ	229 å	245 õ
166 ¦	182 ¶	198 Æ	214 Ö	230 æ	246 ö
167 §	183 ·	199 Ç	215 ×	231 ç	247 ÷
168 ¨	184 ¸	200 È	216 Ø	232 è	248 ø
169 ©	185 ¹	201 É	217 Ù	233 é	249 ù
170 ª	186 º	202 Ê	218 Ú	234 ê	250 ú
171 «	187 »	203 Ë	219 Û	235 ë	251 û
172 ¬	188 ¼	204 Ì	220 Ü	236 ì	252 ü
173 -	189 ½	205 Í	221 Ý	237 í	253 ý
174 ®	190 ¾	206 Î	222 Þ	238 î	254 þ
175 ¯	191 ¿	207 Ï	223 ß	239 ï	255 ÿ

Index

1

15 KHz monitor, 1-6

6

68030, 3-2
68EC020, ix, A-1

A

AA chip set, ix, A-1
AC outlet, 1-13, 3-3
accelerator boards, 3-2
accessory, PCMCIA, 4-1, 5-2, 5-6
active low, B-1
adapter
    23-pin to 15-pin, 1-7
    75-ohm to 300-ohm, 1-7
    graphics, 1-6
    SCART, 1-7
Alt keys, 2-5, 2-9
Amiga Hard Drive User's Guide, xi, 5-3, 5-5
Amiga keys, xi, 2-9
analog RGB, A-1, A-2
analog RGB monitor, 1-6
application disk, 2-1
arrow keys, xi, 2-8, 2-9
assignments, 5-3
attaching external devices
    floppy drive, 1-12
    monitor, 1-6
    mouse, 1-5
    parallel device, 1-12
    serial device, 1-12
audio connection, 1-10
audio equipment, 1-11
audio jacks, 1-10, A-1

B

Backspace, 2-7
backup disks, C-1
battery, memory card, 4-3
bitplanes, A-2
boot priority, 5-4
boot volume, 5-3
bootable disks, 5-4
bootable floppy disk, 2-1
bootable partition, 5-4
booting, 1-14, 2-1, 5-4

C

Caps Lock, 2-6
card disk, 4-3, 5-2

card slot, PCMCIA, 1-4, 4-1, 5-1
CD-ROM drive, 3-2, 5-6
Channel Select switch, 1-8
Chip memory, 3-1, A-1
cleaning mouse, 5-6
clock speed, A-1
clock/calendar, 3-1, A-2
COMP. (composite) jack, 1-6, A-1
composite input, 1-8
composite monitor, 1-7
connecting equipment, 1-2
connecting power, 1-13
connector pins, 5-6
connectors, 1-2, B-1
conventions, x
CPU slot, x, 3-2, A-2, B-10
credit card slot, A-1
CrossDOS, C-4
Ctrl, 2-6
cursor, 2-7, 2-8
custom chips, ix, 3-1, A-1

D

de-interlaced modes, 1-6
Del, 2-8
DF0:, 2-1
DF1:/DF2:, 1-12
directory-caching option, C-4
disconnecting equipment, 1-2
DISK DRIVE port, 1-12, A-1, B-9
disk errors, 4-4, 5-3, C-3
disk utilities, C-4
documentation, xi, 5-2
drive activity lights, 1-3, 2-3, 5-2, C-3
drive alignment, 5-6
drive controller, 5-5

E

eject button, 1-3, C-2
electrical requirements, 1-1, 1-13
Enter, 2-6
Esc, 2-7
ESD, 3-4
expansion options, 3-1
external connectors, 1-5, 5-1, B-1
EXTERNAL VIDEO jack, 1-7

F

F connector, 1-7
Fast memory, 3-1, 4-3, A-1
FFS, C-4
file transfer, C-4
floppy disks, 5-2, C-1
floppy drive, 2-3, 5-6, A-2
floppy drive connector, external, 1-12
floppy-based systems, 2-1, 5-4
formatting disks, C-4
FPU, ix, A-1
function keys, 2-8

G

gadget shortcuts, 2-6
Glossary, xi

H

hard disk, x, 2-1, 3-2, 5-2
hard disk systems, 5-4
hardware failure, 5-3

hardware installation, 5-5
Help, 2-8
Home, 2-8
horizontal scan rate, 1-6, A-2

I

IC chips, 3-4
IDE, 3-2, A-2
IDE interface, x
insertion, PCMCIA card, 4-2
installing options, 3-3
interactions, expansion device, 3-3
interference, electrical, 1-1
international keyboard, 2-5, A-2
interrupting disk activity, 5-2

J

joystick, attaching, 1-12
jumper, ID/unit number, 5-5

K

key combinations, x, 2-4, 2-9
key repeat, 2-5
keyboard, x, 2-2, 2-3, 5-2, A-2
keyboard equivalents, 2-9
keyboard shortcuts, 2-6
keymap, 2-4, 2-5, 5-2, A-2
keys, redefinition, 2-4

L

language settings, 2-2, 5-2
left Amiga, 2-6
light pen, 1-12, B-8

M

main keyboard, 2-5
main unit, x, 1-3, 5-3
making backup copies, 2-2
memory, 3-1, A-1
memory card, 3-2, 4-1
menu shortcuts, 2-6
microprocessor, ix, 3-1, A-1
MIDI interface, attaching, 1-12
modem, 1-12, 3-2, 4-4, 5-2
monitor, 2-3, 5-3
    composite, 1-7
    monaural, 1-11
    multiscan, 1-6
    RGB, 1-6
    stereo, 1-11
monitor cable, 5-3
monitor compatibility, 1-6, A-2
motherboard, 1-2, A-1
mouse, 1-5, 2-9, 3-3, 5-1, 5-6
mouse buttons, 2-9
mouse packing material, 1-5
mouse pad, 1-5
MOUSE port, 1-5, A-1, B-8
MS-DOS, 2-8, C-4
multiscan monitor, 1-6
multitasking, 4-4

N

network access, 2-3
networking hardware, 3-2, 4-4
NTSC, 1-6, 1-7, A-2
numeric keypad, 2-7

O

OFS, C-4
optional equipment, 1-6

P

PAL, 1-6, 1-9, A-2
PAL Audio switch, 1-9
palette, ix, A-2
PARALLEL port, 1-12, A-1, B-4
PC emulators, 3-2
PCMCIA, x, 4-1
PCMCIA card, 3-2
PCMCIA slot, 3-2, A-1
peripherals, 1-2, 1-13, 2-3, 3-3, 5-6, B-1
PgDn, 2-8
pinouts, B-1
pointer, 2-9
power connection, 1-6, 5-5
power light, 1-3
power strip, 1-1, 5-3
power supply, 1-13, 5-5, A-2
power switch, 1-14, 2-3
Preferences, 5-2
    editors, 2-2
    keymap, 2-4
    ScreenMode, A-2
preventing damage, 5-1
printer, 5-2
printer, attaching, 1-12
problems, 5-1

Q

qualifier keys, 2-5, 2-9

R

RAM, 3-1, 4-2
RAM, CPU slot, 3-2
RCA jacks, 1-7, 1-10, A-1
rebooting, 2-3, 4-4, 5-2, C-3
remote access, 2-3
removable media drive, 5-6
requesters, 5-3
Return, xi, 2-6
RF MODULATOR jack, 1-6, 1-8, 1-9, A-1
RGB monitor, 1-6
ribbon cable, 5-5
right Amiga, 2-6
ROM, A-1
ROM card, 4-4
ROM version, 5-5

S

saving work, 2-3
scanner, 1-12
SCART, 1-6, 1-7, 1-9, 1-10
ScreenMode, 5-4
SCSI adapter, 3-2, 4-4
SERIAL port, A-1, B-2
serial printer, attaching, 1-12
Shell, 4-3
Shift keys, 2-5, 2-7, 2-9
software
    installation, 2-2, 3-3, 5-3
    problems, 5-2
speakers, monitor, 1-11
special keys, 2-5, 2-6
startup problems, 5-3
Startup-sequence, 5-3
static electricity, 3-4
stereo sound output, x
surge protector, 1-1
switch box, 1-7

switch, power, 1-14
switch, write protection, 4-2
symbol keys, 2-7

T

Tab, 2-7
tape drive, 3-2
termination, SCSI, 5-5
testing expansion devices, 3-3
text gadgets, 2-7
top panel, 1-3
troubleshooting, 5-1
turning off the Amiga, 2-3

U

unit number jumper, 5-5

V

VCR, 1-7
vertical scan rates, A-2
VGA-style connector, 1-7
VGA/SVGA monitor, 1-6
VIDEO IN jack, 1-7
video mode, default, 5-3
VIDEO port, 1-6, 1-10, A-1
Video Tuning screw, 1-9
voltage, 1-1, 5-3

W

waiting before turning on, 2-3
warranties, 5-6
Workbench, 4-3, 4-4, B-8
Workbench disk, 2-1, 5-4
Workbench screen, 2-2, 4-3
Workbench User's Guide, xi, 2-2, 2-6, 4-2, 5-3, 5-5
write-protect tab, C-1
write-protection, card, 4-4

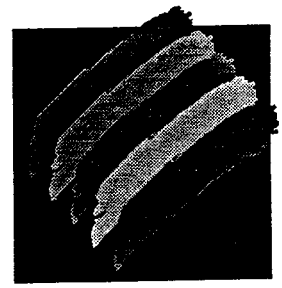
Y

Y adapter, 1-11

Service Addendum

A1200

AMIGA



Commodore

Section 2 - A1200 Service Addendum
Table of Contents

Chapter 1
Introduction

System Features 1-1
A1200 User's Guide 1-2

Chapter 2
Diagnostics

System Startup 2-1
Third Party Diagnostics 2-2
    Memory 2-2
    Ports 2-2

Chapter 3
Replacing and Adding Boards and Options

Replacing the Floppy Disk Drive 3-1
Adding a Real-Time Clock (RTC) 3-3
Replacing the Motherboard 3-4

Chapter 4
Bill of Materials

Chapter 5
System Specification

A1200/A1200HD Functional Specification 5-1
Introduction 5-1
Basic Objectives 5-1
Block Diagram 5-3
Features 5-3
CPU 5-3
Memory and Expansion 5-3
ROM 5-3
Mass Storage 5-3
AA Custom Chips 5-4
Video 5-5
System I/O 5-5
Expansion 5-6
ASICs 5-7
A1200 Power Supply 5-7
Mechanical/Appearance 5-8
A1200 Memory Map 5-8
Environmental Specification 5-9
External Connector Pinouts 5-9
Video Connectors 5-9
RGB Video (DB23 Male) 5-9
Color Composite Video (RCA Jack) 5-9
RF Modulator (RCA Phono Jack, Channel Select SW) 5-10
External System I/O 5-10
Floppy Port (DB23 Female) 5-10
Serial Port (DB25 Male) 5-10
Stereo Audio Ports 5-11
Parallel Port (DB25 Female) 5-11
Mouse/Game Ports 5-12
Power Connector (5 Pin Square DIN) 5-12
Internal Connector Pinouts 5-12
Internal System I/O 5-12
Internal Floppy Signal (Header, 34 Pin DIL) 5-12
Internal Floppy Power (Header, 4 Pin SIL) 5-13
Internal IDE Signal/Power (Header, 44 Pin DIL) 5-14
Keyboard Membrane (31 Pin Locking ZIF, FFC) 5-14
Internal Keyboard LEDS (Header, 5 Pin SIL, keyed) 5-15
Expansion Connector Pinouts 5-15
PCMCIA PC Card 2.0 (68 Pin Rt. Angle) 5-16
Block Diagrams 5-17
150-Pin Card Edge Connector 5-17

Chapter 6
Schematics

A1200 PCB Assembly Schematics 6-1

Chapter 1
Introduction

The *A1200 Service Addendum* supplements the *A1200 User's Guide.* This addendum provides the following information:

- Listing of general system features
- Pointers to specific information about the system
- Explanation of the startup tests
- Instructions for replacing the motherboard and floppy disk drive
- Bill of Materials
- System specifications
- System schematics

System Features

The Amiga 1200 (A1200) offers the most advanced set of features in the Amiga line. These feature include:

- Motorola 68EC020 series microprocessor running at 14 MHz
- AA custom chipset offering graphics with 256 colors from a palette of 16.8 million in all color modes
- Built-in non-interlacing of NTSC and PAL video modes
- Up to 2 MB 32-bit "Chip" memory
- Expandable to 8 MB of "Fast" memory
- IDE (16-bit) hard drive interface
- Optional internal 2.5-inch IDE hard drive
- Built-in 880 KB floppy drive
- PCMCIA "credit card" memory/accessory slot
- Integral full-size keyboard with numeric keypad
- Four-voice stereo sound output
- Internal 150-pin "local-bus" CPU slot
- RGB, color composite, and RF (television) outputs

See Appendix A of the *A1200 User's Guide* for a complete listing of the system's technical specifications.

A1200 User's Guide

This guide acquaints you with the system and offers instruction for system upgrades. It also tells you what information a user has at his disposal. The guide includes the following information:

- Locating system features (Chapter 1)
- Connecting optional equipment (Chapter 1)
- Booting the system (Chapter 2)
- Identifying keyboard features (Chapter 2)
- Identifying expansion options (Chapter 3)
- Inserting and removing card slot devices (Chapter 4)
- Identifying system problems (Chapter 5)
- Listing technical specifications (Appendix A)
- Listing pin assignments for input/output connectors (Appendix B)
- Using floppy disks (Appendix C)
- Listing Amiga character set (Appendix D)

Chapter 2

Diagnostics

There are two types of diagnostic tools available for the A1200:

System Startup	Built into the ROM to run automatically when the system is turned on
Third party diagnostics	Memory and port tests available from third party vendors

System Startup

The system startup sequence consists of a series of tests that run automatically whenever you turn on the computer. This test series resides permanently in kickstart ROM. It performs CPU and keyboard tests to verify basic system operations.

If the system finds an error before the screen display turns on, the screen will remain blank and the system halts. After the screen display turns on, the screen changes color and the system halts if an error occurs. The screen color helps you identify the type of system problem. The screen colors represent:

Test Status	Color	Description
Begin Test	Black	Opening screen
Passed Test	Black	Initial hardware configuration tests passed
		Initial system software tests passed
		Final initialization test passed
Failed Test	Red	ROM error - Reseat or replace
	Green	Chip RAM error
	Blue	Custom Chip(s) error
	Yellow	68000 detected error before software trapped it (software or hardware error)

The system performs the following test sequence:

1. Delays beginning of the tests a fraction of a second to allow the hardware to stabilize.
2. Jumps to ROM code in diagnostic card (if found).
3. Disables and clears all DMA and interrupts.
4. Turns on the screen.
5. Checks the general hardware configuration.

   If the screen remains black and the tests continue, the hardware is O.K.

   If an error occurs, the system halts.

6. Performs checksum test on ROMs.

   If the system fails the ROM test, the screen display turns red and the system halts.

7. Begins the system startup sequence.
8. Sets up temporary exception processing.

   If a processor error occurs, the screen display turns yellow and the system halts.

9. Tests the Chip RAM.

   If memory configuration error occurs, the screen display turns green and the system halts.

10. Tests Custom IC register addresses.

    If address error occurs, the screen display turns blue and the system halts.

11. Checks to see if the system software is operating properly
12. Restores screen.

Third Party Diagnostics

There are several third-party diagnostic programs available that test additional system functionality. Although Commodore cannot guarantee their accuracy in performance and will in no way be responsible for system damage resulting from their use, you may find them helpful in identifying system problems.

Memory

The MBRTest-2 utility, designed by MicroBotics, Inc. runs memory tests under AmigaDOS 1.3, 2.0 and 3.0. It tests all memory types on the motherboard and the bus. For information contact:

MicroBotics, Inc.
1251 American Parkway
Richardson, Texas 75081
USA
Telephone (214) 437-5330

Ports

The ProPort Analyzer for the Amiga utility tests the game, parallel, serial, video, audio ports plus disks and memory. For more information contact:

Amazing Computer
1441 East Flecher Avenue
Tampa, Florida 33612
USA
Telephone (813) 977-6511

Chapter 3

Replacing and Adding Boards and Options

The chapter provides instructions for removing and replacing the system motherboard and floppy disk drive, and adding a real-time clock (RTC). Refer to the *A1200 User's Guide* for information on PCMCIA and card expansion options.

Replacing the Floppy Disk Drive

Use the illustrations in this chapter to help you locate the parts of your system. Follow these instructions to remove and replace the floppy disk drive.

1. Remove the A1200 system top cover screws. Turn the system over and remove the five case screws on the bottom panel as illustrated in Figure 3-1.

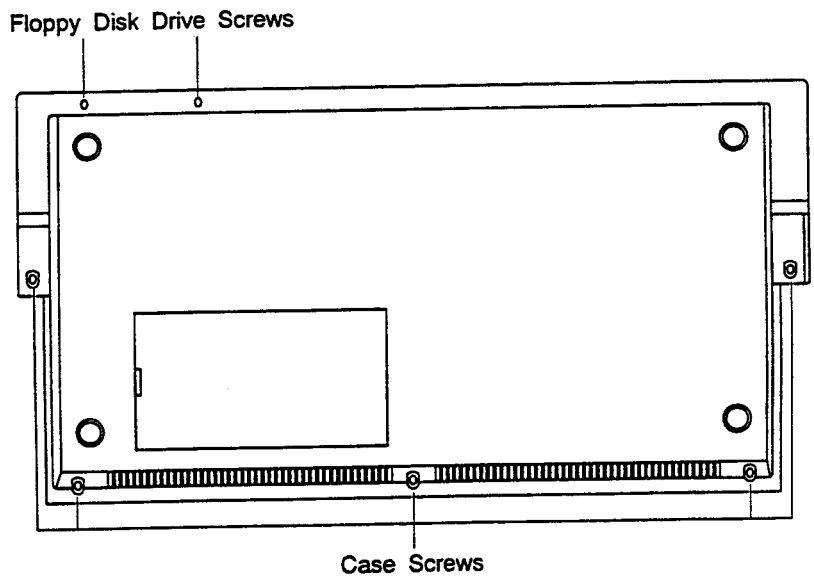


Figure 3-1. Bottom Panel Screw Locations

2. Turn the system over while holding the system bottom panel firmly to the system case.
3. Remove the top panel. Lift the front corners of the top panel. Slide the panel toward the back of the system case. Locate the LED connector illustrated in Figure 3-2. Slide the LED off the connector carefully before completely removing the top panel.

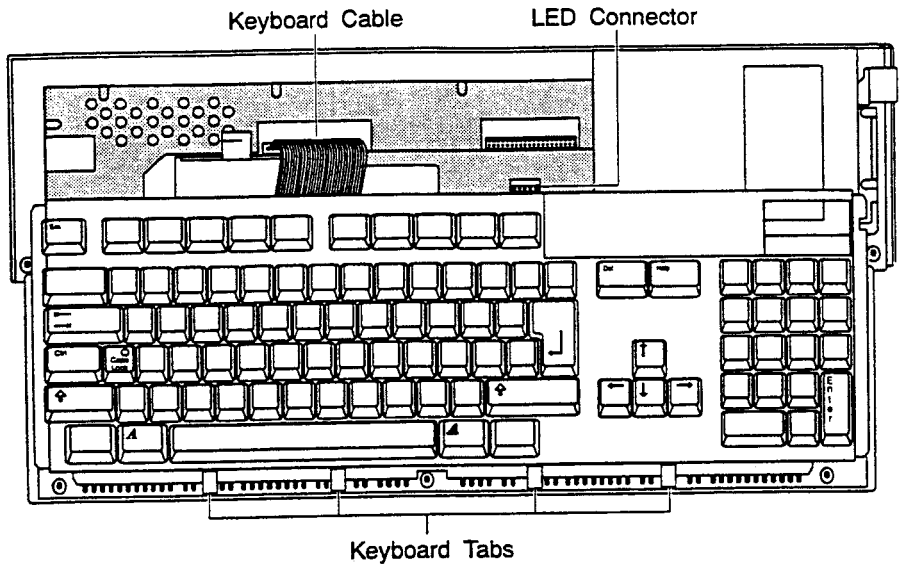


Figure 3-2. Removing the LED Connector and Keyboard

4. Remove the keyboard cable. Locate the keyboard cable illustrated in Figure 3-2. To release the zero insertion force (ZIF) socket, grasp the top of the socket and carefully lift it up. Use a pair of needle-nosed tweezers, if necessary, to hold the top edge of the socket as you lift it up. To avoid cable damage you must release the socket before attempting to remove the cable. Hold the keyboard ribbon cable by its outside edges and slide it out of the socket. To insert the cable, make certain the socket is lifted up in the release position. Place the cable in the socket and gently push down on the cable's outside edges to press the socket down in a locked position.
5. Remove the keyboard. Locate the keyboard tabs illustrated in Figure 3-2. Hold the top outside corners of the keyboard and lift the upper edge up slightly. Slide the bottom edge of the keyboard out of the keyboard restraining tabs on the system case.
6. Remove the floppy disk drive. Locate the three floppy disk drive screws (two screws illustrated in Figure 3-1 and one in Figure 3-3) attaching the floppy disk drive to the system. Remove the screws and lift the floppy disk drive out of the system. Some systems have a shim between the floppy disk drive and the system case. If you remove it, match the holes in the shim with the screw holes in the system case when you replace it.

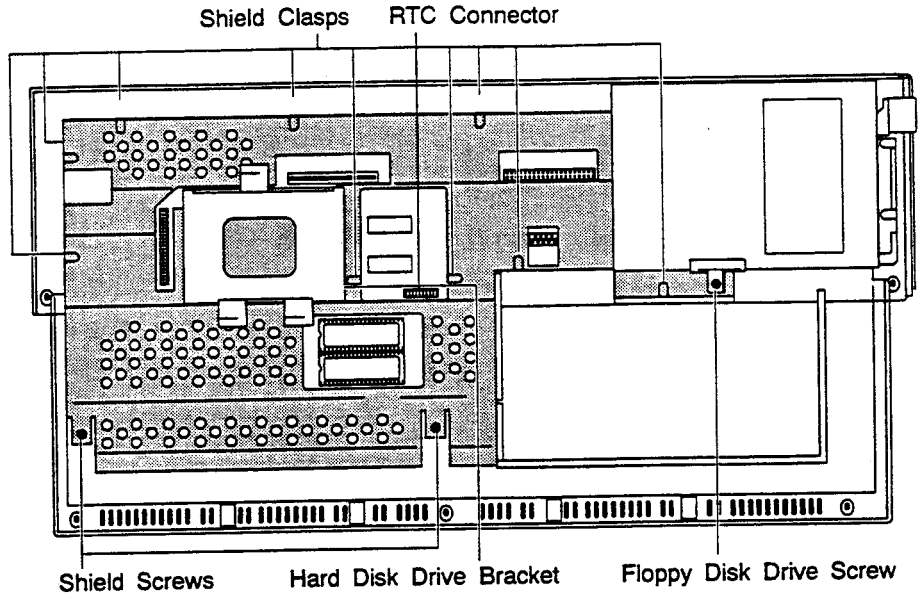


Figure 3-3. Removing the Hard Disk Drive Bracket, Floppy Disk Drive and Shield

To replace the floppy disk drive, reverse the steps you followed to remove the board.

Adding a Real-Time Clock (RTC)

Follow these instructions to add a RTC to the motherboard.

1. Follow steps 1-4 in "*Replacing the Floppy Disk Drive*" to remove the keyboard. The 22-pin connector socket for the RTC is visible through a cutout the motherboard shield.
2. Figure 3-4 shows you the location of the RTC 22-pin connector on the motherboard. It is not necessary to remove the motherboard shield to insert the RTC. Figure 3-4 simply gives you a clear picture of the location of the RTC on the motherboard.

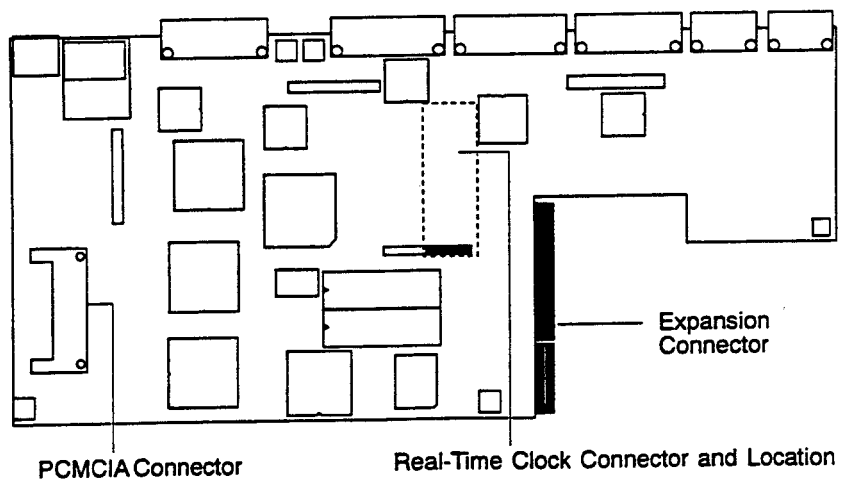


Figure 3-4. Real-Time Clock

3. Place the RTC firmly in the connector
4. Replace the keyboard by reversing steps 1-4 in "*Replacing the Floppy Disk Drive*".

Replacing the Motherboard

Follow these instructions to remove and replace the motherboard.

1. Follow steps 1-5 in "*Replacing the Floppy Disk Drive*".
2. Remove the hard disk drive bracket. Locate the hard disk drive bracket illustrated in Figure 3-3. The bracket tabs go into slots on the motherboard. Lift it straight off the motherboard.
3. Remove the shield assembly. Locate the shield screws illustrated in Figure 3-3 and remove them. Lift the shield assembly out of the bottom of the system case.
4. Remove the motherboard. Locate the shield clasps illustrated in Figure 3-3 and bend them to an upright position. The clasps are sharp. Use caution when bending then. Lift the top shield off the bottom shield. Use a hex-nut screwdriver to remove the twelve jackpost screws from the connectors across the back of the motherboard. Lift the motherboard out of the bottom shield.

To replace the motherboard reverse the steps listed above. Securely fasten the screw on the right front corner of the motherboard. It acts as a ground for the motherboard.

Chapter 4
Bill of Materials

The following information is taken from the A1200 Bill of Materials (BOM).

- Title of the drawing
- Number and revision level of the drawing
- Part number of each part
- Description of each part
- Reference description/notes for each part

The BOM contains additional product configuration data not reproduced in this table. The BOM is updated periodically. For a complete current listing of all the information contained in a BOM (including line item numbers), request the latest revision BOM drawings (by drawing number) from Engineering Documentation in West Chester.

The following bracket types are used as to associate a part with an assembly or indicate a note:

Bracket	Description
[ ]	National Television Standard Committee (NTSC) US television standard
( )	Phase Alternation Line (PAL) European television standard
< >	Real-Time Clock (RTC)
{ }	Notes

PCB Assembly, A1200 (364718 Rev E)

364718-01	PCB Assembly, A1200 NTSC, 1M
364718-02	PCB Assembly, A1200 PAL, 1M
364718-03	PCB Assembly, A1200HD NTSC, 1M
364718-04	PCB Assembly, A1200HD PAL, 1M
364718-05	PCB Assembly, A1200 NTSC, 2M, RTC
364718-06	PCB Assembly, A1200 PAL, 2M, RTC
364718-07	PCB Assembly, A1200HD NTSC, 2M, RTC
364718-08	PCB Assembly, A1200HD PAL, 2M, RTC
364718-09	PCB Assembly, A1200 NTSC, 2M
364718-10	PCB Assembly, A1200 PAL, 2M
364718-11	PCB Assembly, A1200HD NTSC, 2M
364718-12	PCB Assembly, A1200HD PAL, 2M
364717-01	Schematic
364719-01	PCB Fab
364725-01	Functional Description
364720-01	Artwork

PCB Assembly, A1200 (364718 Rev E) (cont'd)

	INTEGRATED CIRCUITS	
391506-01	IC, CPU, MC68EC020, 16 MHz, 100-Pin PQFP	U1
391010-01	IC, CSG, 8374, ALICE, 84-Pin PLCC	U2
391227-01	IC, CSG, 4203, LISA, 84-Pin PLCC	U4
391077-01	IC, CSG, 8364R7, PAULA, 52-Pin PLCC	U3
391424-02	IC, CSG, Gate Array, AA GAYLE, 84-Pin PLCC	U5
391508-01	IC, 68HC05C, Keyboard MPU, 44-Pin PLCC	U13
391078-01	IC, CSG, 8520R4, CIA, 1MHz, 44-Pin PLCC	U7, U8
391425-01	IC, BUDGIE, 128-Pin PQFP	U20
391144-01	IC, 74HCT244, SM	U32
391142-01	IC, 74LS245, SM	U43, U45-U47
391426-01	IC, 74LS166, SM	U34
391176-01	IC, 74F139, SM	U23
391087-01	IC, Interface, MC1488D, SM	U28
391086-01	IC, Interface, MC1489D, SM	U29
391103-01	IC, Linear, LF347/TLO84ACD, SM	U15
391283-02	IC, Voltage Detector, RH5VA43A, SM	U49
391105-01	IC, DRAM, 256KX16, 80 nS, SM	U16, U17, {for -01 to -04} U16-U19, {for -05 to -12}
391557-01	IC, RICOH, RTC, RF5C01A, SM	<U9>
391508-02	IC, 68HC05C12, Keyboard MPU,SM	Substitute for PN 391508-01
391524-01	IC, ROM, Kickstart, A1200HD, ROM 1,40-Pin DIP	U6B
391523-01	IC, ROM, Kickstart, A1200HD, ROM 0,40-Pin DIP	U6A
391084-01	IC, Video Encoder, CXA1145M, SM	U12
391511-01	IC, 74LS86, SM	U26
391422-01	IC, Video DAC,Triple 8-Bit, 30 MHz,44-Pin PLCC	U30
391422-02	IC, Video DAC,Triple 8-Bit, 30 MHz,44-Pin PLCC	U30; {Do Not Stuff D215 and R215} Substitute for PN 391422-01
391558-01	IC, PAL, 16R4-10 Programmed PLCC, ROMFEST	XU9; Programmed into PN 391359-03 Substitute for PN 391549-02
391549-01	IC, GAL, 16V8-10 Programmed PLCC, ROMFEST	XU9; Programmed into PN 391347-01 Substitute for PN 391549-02
391543-01	IC, SM, 74HCT244, EIAJ Package	Substitute for PN 391144-01
391544-01	IC, SM, 74LS245, EIAJ Package	Substitute for PN 391142-01
391546-01	IC, SM, 74LS86, EIAJ Package	Substitute for PN 391511-01
391547-01	IC, SM, 74LS166, EIAJ Package	Substitute for PN 391426-01
391554-01	IC, Linear, LF347, EIAJ Package	Substitute for PN 391103-01
391549-02	IC, PAL, 16V8-15 Prog. PLCC ROMFEST	XU9; Program into 391347-03
391558-02	IC, PAL, 16R4-15 Prog. PLCC ROMFEST	Program into PN 391359-04,- Substitute PN 391549-02
	FILTERS	
391092-01	Chip Ferrite Bead, Large (1812)	E301, FB401B, FB402D, FB992
391092-02	Chip Ferrite Bead, Medium (1206)	E231R, E258R-E260R, E263R-E265R, E597R, E598R
391515-01	Chip Ferrite Bead, Small (0805)	[E351R, E353R-E358R, E361R, E363R-E368R, E580R-E596R, E599R]
251878-02	Line Filter	(LF1)
391146-02	Bandpass Filter, F-K5-MS	[Z221]
391147-02	Delay Line, F-K5-MD	[Z222]

PCB Assembly, A1200 (364718 Rev E) (cont'd)

391146-01	Bandpass Filter, BPF-K5-MS	(Z221)
391147-01	Delay Line, F-KS-MT	(Z222)
390253-04	Ferrite Bead, 3-Turn	[LF1B, LF1D]
903025-08	Ferrite Bead, Axial, Large	[LF1A, LF1C]
390818-03	Chip Cap, NPO, 15pF (1206)	(C242)
391318-09	Chip Cap, NPO, 22pF (0805)	C621, C622, E112C-E114C, E123C-E129C, E375C-E377C, <C911> E121C, E122C, E131C-E133C
391318-01	Chip Cap, NPO, 47pF (0805)	E258C-E260C
390818-05	Chip Cap, NPO, 56pF (1206)	C245, (C241)
391318-03	Chip Cap, NPO, 100pF (0805)	E231C, E251C-E257C, E261C, E266C, E267C, E511C-E523C, E525C, E551C, E552C, E558C, E580C-E596C, E599C,
391095-06	Chip Cap, X7R, 470pF (0805)	E351C, E353C, E354C, E361C, E363C, E364C, E374C, E553C-E556C
390853-07	Chip Cap, X7R, 1000pF (1206)	(C243)
390853-08	Chip Cap, X7R, 3900pF (1206)	C321, C323, C331, C333
391095-04	Chip Cap, X7R, 6800pF (0805)	C322, C332, E321C, E331C, E355C-E358C, E365C-E368C
391095-11	Chip Cap, X7R, .01uF (0805)	C216, C246, C349, C591, C592, C800-C803, E232C, E263C-E265C, E524C, E557C, E561C, E562C, E597C, E598C, (C244)
390853-04	Chip Cap, X7R, .047uF (1206)	C0B, C0D, C12B, C1B, C1D, C20B, C20D, C23, C26, C28A, C28B, C29, C30B, C311-C314, C34
310027-02	Chip Cap, Z5U, .1uF (1206)	C215, C221, C222, <C9>
310027-05	Chip Cap, Z5U, .22uF (1206)	C0A, C0C, C12A, C13, C16A-C20A, C16B-C19B, C199, C1A, C1C, C20C, C211-C213, C2A, C2B, C2X, C3, C301, C302, C305, C30A, C32, C352, C362, C43, C45-C47, C461, C4A, C4B, C551, C552, C5A, C5B, C6A, C6B, C7, C701, C702, C711, C8, C804, XC9 {C18A, C18B, C19A, C19B for -05 to -12}
391097-07	Capacitor, Alum Elect, 10uF 25V, SM, (C)	C214, C306, C407, C460
391097-08	Capacitor, Alum Elect, 22uF 25V, SM, (D)	C303, C304, C324, C334, C459
391097-04	Capacitor, Alum Elect, 47uF 16V, SM, (D)	C821, C822
391097-01	Capacitor, Alum Elect, 100uF 6.3V, SM, (D)	C235, C236, C239, C409
390797-01	Chip Capacitor Z5U, .33uF (1210)	C30C, C30D
390101-10	Capacitor, Alum Elect, 1000uF 10V	C408, C811
390101-03	Capacitor, Alum Elect, 470uF 16V	C237, C307
391231-02	Capacitor, Tantalum, 10uF 16	<C913>
	RESISTOR, 1/10w, 5%	
391509-03	Chip Resistor, 27 Ohm (0805)	(E580R, E583R-585R, E587R, E590R-E595R, E599R), E123R, 125R-E129R, E376R, E377R, R114, R116, R117, R162-R164, R599
391509-04	Chip Resistor, 47 Ohm (0805)	E253R-E256R, E557R, E561R, E562R

PCB Assembly, A1200 (364718 Rev E)		(cont'd)
391509-05	Chip Resistor, 68 Ohm (0805)	E112R-E114R, E121R, E122R, E124R, E131R-E133R, E251R, E252R, E257R, E261R-E262R, E266R, E267R, E374R, E375R, E511R-E523R, E525R, E551R-E556R, E558R, R113, R151A-R151I, R152A-R152G, (E351R,E353R-E358R, E361R, E363R-E368R, E581R, E582R, E586R, E588R, E589R, E596R)
391509-15	Chip Resistor, 470 Ohm (0805)	R101, R103, R161, R233A-R233D, R593, R659, R660, R952A, R952B, R953A-R953F, R954C, R954D, <R911>
391509-18	Chip Resistor, 1K Ohm (0805)	R102, R104, R222, R319, R324, R334, R512, R591, R592, R654, R954A-R954B, R954E, XR9, (R244), <R917>, R215 {Do not stuff R215 when using PN 391422-02), R202
391509-24	Chip Resistor, 4.7K Ohm (0805)	R204, R250-R253, R348, R370A-R370H, R621A-R621G, R624A-R624F, R632, R634, R636, R651,R655, R715X, R951A-R951G, R971, (R241)
391509-26	Chip Resistor, 10K Ohm (0805)	R209, R322, R323, R327, R329, R332, R333, R337, R339, R346, R511A-R511F, R572, R623, R629, R631, R633, R635, R652, R653, R656, R657, R701, R715A-R715H, R715Y, R716-R718, (R243), <R912, R914-R916, R919A-R919H>
	RESISTORS, 1/8W, 5%	
310026-26	Chip Resistor, 0 Ohm (1206)	E321R, E331R, XJ1 ,XJ2, XJ3, [R203, R225]
310026-09	Chip Resistor, 10 Ohm (1206)	R301, R302
310026-12	Chip Resistor, 68 Ohm (1206)	R115
310026-29	Chip Resistor, 75 Ohm (1206)	R232E, R234D
310026-05	Chip Resistor, 100 Ohm (1206)	R237, R622, R639
310026-24	Chip Resistor, 120 Ohm (1206)	R714A, R714B
310026-42	Chip Resistor, 180 Ohm (1206)	[R236]
310026-14	Chip Resistor, 360 Ohm (1206)	R235, (R236)
310026-21	Chip Resistor, 470 Ohm (1206)	<R913>
310026-11	Chip Resistor, 820 Ohm (1206)	R224, (R221)
310026-36	Chip Resistor, 910 Ohm (1206)	(R223)
310026-54	Chip Resistor, 1.2K Ohm (1206)	[R221,R223]
310026-25	Chip Resistor, 1.5K Ohm (1206)	R321, R331
310026-16	Chip Resistor, 2.7K Ohm (1206)	R347, R571, (R245), [R246]
310026-35	Chip Resistor, 6.8K Ohm (1206)	(R242)
310026-23	Chip Resistor, 22K Ohm (1206)	R345
310026-27	Chip Resistor, 27K Ohm (1206)	R459
310026-18	Chip Resistor, 33K Ohm (1206)	R349
310026-03	Chip Resistor, 47K Ohm (1206)	<R918>
310026-19	Chip Resistor, 470K Ohm (1206)	R326, R336
310026-20	Chip Resistor, 1M Ohm (1206)	R628

PCB Assembly, A1200 (364718 Rev E) (cont'd)

	RESISTORS, 1/10W, 1%	
391507-01	Chip Resistor, 15 Ohm (0805)	R216
391507-09	Chip Resistor, 511 Ohm (0805)	R217
	RESISTORS, 1/8W, 1%	
391154-14	Chip Resistor, 24.9 Ohm (1206)	R232A-R232C
391154-12	Chip Resistor, 49.9 Ohm (1206)	R231A-R231C
391154-03	Chip Resistor, 1K Ohm (1206)	R303, R304
391154-04	Chip Resistor, 2K Ohm (1206)	R325, R335
	RESISTORS, 1W, 5%	
391093-01	Chip Resistor, 1 Ohm (2512)	R309
391093-02	Chip Resistor, 4.7 Ohm (2512)	E232R, R352, R362
391093-04	Chip Resistor, 47 Ohm (2512)	E524R
	CONNECTORS	
390241-03	D-SUB, 23-Pin, Female, DB23S	CN5, {External Floppy}
390242-03	D-SUB, 23-Pin, Male, DB23P	CN9, {RGB Video}
390241-05	D-SUB, 25-Pin, Female, DB25S	CN7, {Parallel Port}
390242-05	D-SUB, 25-Pin, Male, DB25P	CN6, {Serial Port}
390242-01	D-SUB, 9-Pin, Male, DB9P	CN1, CN2, {Mouse/Joystick}
252122-03	RCA Jack, Yellow	CN10, {Composite Video}
252122-01	RCA Jack, White	CN4, {Left Audio}
252122-02	RCA Jack, Red	CN3, {Right Audio}
252167-01	DIN, 5-Pin, Square	CN8, {CPU Power}
325516-04	SIL, 4-Pin, Header	CN12, {Floppy Power}
903345-17	DIL, 34-Pin, Header w/key (Pin 3)	CN11, {Floppy Signal}
391153-01	DIL, 44-Pin, Header w/key (Pin 20)	CN16, {HDD}
391073-01	68-Pin, Right Angle, High Density	CN15, {PCMCIA Port}
390492-04	31-Pin, Locking ZIF, FFC	CN13, {Keyboard}
251065-04	SIL, 5-Pin, Header, w/key (Pin 4)	CN14, {LED}
391153-03	Header, 2mm, 22-Pin	P9B
391153-02	Header, 2mm, 40-Pin	P9B
	TRANSISTORS	
391145-01	JFET, MPF102/PN4302, SOT23	Q321, Q331
391121-01	NPN, 2N3904, SOT23	Q201, Q571,Q651, Q653, (Q461)
391122-01	PNP, 2N3906, SOT23	Q341, Q631-Q633, Q652, Q654
	DIODES	
391421-01	LM385, Voltage Reference, 1.2V, S0-8	D215 {Do not stuff when using, PN 391422-02}
391129-01	1N4148, SOT23	D231A-D233A, D231B-D233B, D571 <D911, D912>
391128-01	1N914, SOT23	Substitute for PN 391129-01
391327-01	1N4001, MELF	D572, D573, D574, D575, D576
	MISCELLANEOUS	
391138-01	Chip Inductor, 1.2uH (1206)	(L241)
252345-01	Crystal, 4.433619 MHz	(Y451)
325566-01	Oscillator, 28.63636 MHz	[X1]
252344-01	Oscillator, 28.37516 MHz	(X1)
904150-09	Socket, 42-Pin DIP	U6A, U6B
313371-01	Modulator, MDG-VA3424	[X2]

PCB Assembly, A1200 (364718 Rev E) (cont'd)

313371-05	Modulator, MDG-UD3626	(X2)
391156-01	Ceramic Resonator, 3.00 MHz	Y621
391260-01	Battery, NiCd, 3/V30R, 3.6V, 30 mAh	<BT9> *Note - Flatpack Version
900560-01	Crystal, 32.768 KHz	<Y9>
251029-06	Capacitor, Variable, 6.8-45pF	<TC9>
366648-01	Bar-Code Label, Blank, 0.5" x 1.75"	
366649-01	Bar-Code Label, Blank, 0.5" x 1.00"	
	UNSTUFFED LOCATIONS	
	Integrated Circuits, 68-Pin, PLCC	U0
	Integrated Circuits, 14-Pin, SOIC	U26X, XU1, XU2, XU3
	Resistor (0805)	R100, R118, R238, R598, R626, R637, R638, R658
	Resistor (1206)	XJ4, R625, XJ9
	Capacitor (0805)	C152A-C152F, E262C
	Capacitor (1206)	C629, XC1-XC3
	Transistor SOT23	Q634
	Filters	FB401A, FB402A-FB402C
	Connectors, 10-Pin, DIL	CN1A
	Connectors, 10-Pin, SIL	TP1, TP2, TP3
	Connectors, 40-Pin, DIL	P9A

Main Assembly, A1200 1M (364943 Rev C)

364943-01	Main Assembly, A1200, US/CN	1M
364943-02	Main Assembly, A1200, GR/AU	1M
364943-03	Main Assembly, A1200, FR/BE	1M
364943-04	Main Assembly, A1200, SD/FN	1M
364943-05	Main Assembly, A1200, SP	1M
364943-06	Main Assembly, A1200, DN	1M
364943-07	Main Assembly, A1200, SEV	1M
364943-08	Main Assembly, A1200, NR	1M
364943-09	Main Assembly, A1200, NE/AL/CEL	1M
364943-10	Main Assembly, A1200, UK	1M
364943-11	Main Assembly, A1200, IT	1M
364943-12	Main Assembly, A1200, PG	1M
364943-13	Main Assembly, A1200, FN	(Inactive)
364914-01	Top Case	
364951-01	Keyboard Assembly, ASCII, US/CN, NE/AL/CEL	
364951-04	Keyboard Assembly, German	
364951-05	Keyboard Assembly, French	
364951-12	Keyboard Assembly, Swedish/Finnish	
364951-07	Keyboard Assembly, Spanish	
364951-15	Keyboard Assembly, Danish	
364951-08	Keyboard Assembly, Swiss	
364951-11	Keyboard Assembly, Norwegian	
364951-03	Keyboard Assembly, UK	
364951-06	Keyboard Assembly, Italian	
364951-20	Keyboard Assembly, Portuguese	
364951-99	Keyboard Assembly, Blank 96 Keys	

Main Assembly, A1200 1M (364943 Rev C) (cont'd)

364951-98	Keyboard Assembly, Blank 94 Keys	
364951-21	Keyboard Assembly, USA/Canada	Substitute for PN 364951-01 Only
950150-06	Feet, Rubber, Black	Substitute for PN 950150-03
390251-01	Jackpost Standoff	
390251-03	Jackpost Standoff	Substitute for PN 390251-01
324530-02	Jackpost Standoff	Substitute for PN 390251-01
364423-04	Cable Assembly, Floppy Disk Drive	
327207-02	Harness, Disk Power Assemby	
364913-01	Bottom Case	
364912-01	Ram Door	
363914-03	3.5" Floppy Disk Drive	Substitute for PN 363914-01
364718-01	PCB Assembly, NTSC	
364718-02	PCB Assembly, PAL	
364967-01	LED Assembly	
363951-20	Nameplate, A1200	
364911-01	Top Shield	
364910-01	Bottom Shield	
364981-01	Insulation Sheet	
364982-01	Floppy Disk Drive Support Bracket	
363914-01	3.5" Floppy Disk Drive Assembly, Chinon	
364983-01	Support HHD	
369521-01	Rating & Serial Number Label, PAL	Made in Germany
369521-02	Rating & Serial Number Label, NTSC	Made in Germany
369521-03	Rating & Serial Number Label, PAL	Made in USA
369521-04	Rating & Serial Number Label, NTSC	Made in USA
369521-05	Rating & Serial Number Label, PAL	Made in Hong Kong
369521-06	Rating & Serial Number Label, NTSC	Made in Hong Kong
369521-07	Rating & Serial Number Label, PAL	Made in Philippines
369521-08	Rating & Serial Number Label, NTSC	Made in Philippines
325090-02	Sticker Seal	
950150-03	Feet, Rubber, White	
906883-03	Screw, 3m x 6.0mm, Self Tapping	Fasten top and bottom case
906800-05	Screw, 3m x 6.0mm, Machine, Phillip, Pan Head	FDD to bottom case [See below] (Quantity of 3 if PN 363914-01 is used)
906883-01	Screw, 3m x 8.0mm, Self Tapping	FDD bracket., bottom.shield to bottom case
369521-09	Label, Rating & Serial Number - PAL	Made in UK
369521-10	Label, Rating & Serial Number - NTSC	Made in UK
366448-01	Label, Bar Code, 0.5" x 1.75"	
365015-01	Cover, Ram Expansion, Modular	
391537-01	Clip, Grounding	
365085-01	Cover, Expansion Port	
365084-01	Cover, Expansion Port	Substitute for PN 365085-01
906800-05	Screw, 3m x 6.0mm, Machine, Phillip, Pan Head	Use with PN 365084-01

LED Assembly, A1200/A1200HD (364967Rev A)

364967-01	LED Assembly, A1200/A1200HD	
364965-01	PCB Fabrication	
364966-01	Schematic	
364964-01	Artwork	
364963-01	PCB Assembly	
252018-02	LED, 2 x 15mm, Green	LED 1
252018-05	LED, 2 x 15mm, Yellow	LED 2, LED 3
903351-01	Connector Housing, 5-Position	
903353-01	Connector Pin	
903325-01	Plug, Keying, Polarizing	Pin 4 of PN 903351-01
903756-10	Wire, AWG #24, Black, Length=300mm	
903756-02	Wire, AWG #24, Red, Length=300mm	
903756-03	Wire, AWG #24, Orange, Length=300mm	
903756-05	Wire, AWG #24, Green, Length=300mm	
391131-01	Resistor, 33-Ohm, 1/8W, 5%,	R1, R2, R3

Software Assembly, Level 1, AMIGA V3.0 (365057 Rev A)

365057-01	Software Assembly, Level 1, V3.0,	English
365057-02	Software Assembly, Level 1, V3.0	French
365057-03	Software Assembly, Level 1, V3.0,	German
365057-04	Software Assembly, Level 1, V3.0	Italian
365036-01	Disk Sub Assembly, Level 1, AMIGA V3.0	International
368914-01	Manual, Workbench V3.0	English
368915-01	Manual, Workbench V3.0	French
368917-01	Manual, Workbench V3.0	German
368916-01	Manual, Workbench V3.0	Italian
318757-17	Shrink Wrap	
380913-02	Polybag, Catch, 120mm x 170mm	Substitute for PN 318757-17

Main Assembly, A1200 2M (365067 Rev C)

365067-01	Main Assembly, A1200, 2M US/CN	
365067-02	Main Assembly, A1200, 2M GR/AU	
365067-03	Main Assembly, A1200, 2M FR/BE	
365067-04	Main Assembly, A1200, 2M SD/FN	
365067-05	Main Assembly, A1200, 2M SP	
365067-06	Main Assembly, A1200, 2M DN	
365067-07	Main Assembly, A1200, 2M SEV	
365067-08	Main Assembly, A1200, 2M NR	
365067-09	Main Assembly, A1200, 2M NE/AL/CEL	
365067-10	Main Assembly, A1200, 2M UK	
365067-11	Main Assembly, A1200, 2M IT	
365067-12	Main Assembly, A1200, 2M PG	
365067-13	Main Assembly, A1200, FN	(Inactive)
365067-98	Main Assembly, A1200, Blank, 94-key Keyboard	
365067-99	Main Assembly, A1200, Blank, 96-key Keyboard	
364914-01	Top Case	
364951-01	Keyboard Assembly, ASCII US/CN NE/AL/CEL	

Main Assembly, A1200 2M (365067 Rev C) (cont'd)

364951-04	Keyboard Assembly, German	
364951-05	Keyboard Assembly, French	
364951-12	Keyboard Assembly, Swedish/Finnish	
364951-07	Keyboard Assembly, Spanish	
364951-15	Keyboard Assembly, Danish	
364951-08	Keyboard Assembly, Swiss	
364951-11	Keyboard Assembly, Norwegian	
364951-03	Keyboard Assembly, UK	
364951-06	Keyboard Assembly, Italian	
364951-20	Keyboard Assembly, Portuguese	
364951-99	Keyboard Assembly, Blank 96 Keys	
364951-98	Keyboard Assembly, Blank 94 Keys	
364951-21	Keyboard Assembly, US/CN	Substitute for PN 364951-01 only
950150-06	Feet, Rubber, Black	Substitute for PN 950150-03
390251-01	Jackpost Standoff	
390251-03	Jackpost Standoff	Substitute for PN 390251-01
324530-02	Jackpost Standoff	Substitute for PN 390251-01
364423-04	Cable Assembly, Floppy Disk Drive	
327207-02	Harness, Disk Power Assembly	
364913-01	Bottom Case	
364912-01	RAM Door	
363914-03	3.5" Floppy Disk Drive	Substitute for PN 363914-01
364718-09	PCB Assembly, NTSC	
364718-10	PCB Assembly, PAL	
364967-01	LED Assembly	
363951-20	Nameplate, A1200	
364911-01	Top Shield	
364910-01	Bottom Shield	
364981-01	Insulation Sheet	
364982-01	Floppy Disk Drive Support Bracket	
363914-01	3.5" Floppy Disk Drive Assemby, CHINON	
364983-01	Support HHD	
369521-01	Rating & Serial Number Label, PAL	Made in Germany
369521-02	Rating & Serial Number Label, NTSC	Made in Germany
369521-03	Rating & Serial Number Label, PAL	Made in USA
369521-04	Rating & Serial Number Label, NTSC	Made in USA
369521-05	Rating & Serial Number Label, PAL	Made in Hong Kong
369521-06	Rating & Serial Number Label, NTSC	Made in Hong Kong
369521-07	Rating & Serial Number Label, PAL	Made in Philippines
369521-08	Rating & Serial Number Label, NTSC	Made in Philippines
325090-02	Sticker Seal	
950150-03	Feet, Rubber, White	
906883-03	Screw, 3m x 6.0mm, Self Tapping	Fasten top and bottom case
906800-05	Screw, 3m x 6.0mm, Machine, Phillip, PH	FDD to bottom case [see below] (quantity of 3 if PN 363914-01 is used)
906883-01	Screw, 3m x 8.0mm, Self Tapping	FDD bracket, bottom shield to bottom case
369521-09	Label, Rating & Serial Number- PAL	Made in UK

Main Assembly, A1200 2M (365067 Rev C) (cont'd)		
369521-10	Label, Rating & Serial Number- NTSC	Made in UK
366448-01	Label, Bar Code, 0.5" x 1.75"	
365015-01	Cover, RAM Expansion Modular	
391537-01	Clip, Grounding	
365085-01	Cover, Expansion Port	
365084-01	Cover, Expansion Port	Substitute for PN 365085-01
906800-05	Screw, M3 x 6.0, Machine. PHL. Pan Head	Use with PN 365084-01

A1200 1M, (530311 Rev G)		
530311-01	A1200, US	
530311-02	A1200, CN	
530311-03	A1200, UK	
530311-04	A1200, GR	
530311-05	A1200, FR	
530311-06	A1200, IT	
530311-07	A1200, SP	
530311-08	A1200, SG	
530311-09	A1200, SF	
530311-10	A1200, AU	
530311-11	A1200, NR	
530311-12	A1200, SD	
530311-13	A1200, FN	
530311-14	A1200, NE	
530311-15	A1200, DN	
530311-16	A1200, BF	
530311-17	A1200, BD	
530311-18	A1200, AL	
530311-19	A1200, CEL	
530311-20	A1200, PG	
364941-01	Master Shipping Box, A1200	* = 0.25
364942-01	Packing Box, A1200	
364943-01	Main Assembly, US/CN	
364943-02	Main Assembly, GR/AU	
364943-03	Main Assembly, FR/BE	
364943-04	Main Assembly, SD/FN	
364943-05	Main Assembly, SP	
364943-06	Main Assembly, DN	
364943-07	Main Assembly, SW	
364943-08	Main Assembly, NR	
364943-09	Main Assembly, NE/AL/CEL	
364943-10	Main Assembly, UK	
364943-11	Main Assembly, IT	
364943-12	Main Assembly, PG	
1540025-01	Polybag, Anti-Static	
324257-01	Bag, Drying Agent	Place in PN 1540025-01
364057-01	End Capacitor, Set	
904778-01	RF Switch Box	

A1200 1M, (530311 Rev G) (cont'd)

326189-01	RF Cable	
391029-01	Power Supply, UL/CSA	110V
391029-02	Power Supply, BSI	240V
391029-03	Power Supply, VDE	220V
391029-04	Power Supply, SEV	220V
391029-05	Power Supply, SAA	220V
251846-04	RF Cable	PAL
327124-05	Mouse Assembly	
390925-01	Cable, 25-Pin SCART to 23-Pin D-SUB	For TV connection
318143-02	Glue, White	
368084-01	Seal, Tamper evident	Place on flaps of PN 364942-01
364346-01	Box, Accessory	
365016-01	Spacer	Use with PN 364346-01
369516-01	Label, UPC	
999104-01	Tape, Machine, 2-inch clear	For box flaps of PN 364941-01
365057-01	Software Sub Assembly, Level 1, V3.0	English
365057-03	Software Sub Assembly, Level 1, V3.0	German
365057-02	Software Sub Assembly, Level 1, V3.0	French
365057-04	Software Sub Assembly, Level 1, V3.0	Italian
318896-04	Software License Agreement	English
318708-02	Software License Agreement	German
325349-01	Warranty Card, UK	
318365-04	Warranty Card, US	
318882-02	Warranty Card, CN	
320046-06	Warranty Card, GR	
325254-01	Warranty Card, FR	
368014-02	Warranty Card, AL	
312341-02	Disk Exchange Card, US	
318556-02	Disk Exchange Card, CN	
371110-01	Introducing the A1200, UK English	
368997-01	Introducing the A1200, English	
371000-01	Introducing the A1200, German	
368998-01	Introducing the A1200, French	
368999-01	Introducing the A1200, Italian	
371105-01	Introducing the A1200, Swedish	
318876-02	Service Center List, AL	
368997-03	Errata, Adapter	Multilingual
366648-01	Label, Bar Code, 0.5" x 1.75"	
371116-01	FTZ Statement	
371104-01	Introducing the A1200, Portuguese	
371106-01	Introducing the A1200, Spanish	
371107-01	Introducing the A1200, Norwegian	
371108-01	Introducing the A1200, Danish	

A1200 2M, (530318 Rev G)

530318-01	A1200, US	
530318-02	A1200, CN	
530318-03	A1200, UK	
530318-04	A1200, GR	
530318-05	A1200, FR	
530318-06	A1200, IT	
530318-07	A1200, SP	
530318-08	A1200, SG	
530318-09	A1200, SF	
530318-10	A1200, AU	
530318-11	A1200, NR	
530318-12	A1200, SD	
530318-13	A1200, FN	
530318-14	A1200, NE	
530318-15	A1200, DN	
530318-16	A1200, BF	
530318-17	A1200, BD	
530318-18	A1200, AL	
530318-19	A1200, CEL	
530318-20	A1200, PG	
364941-01	Master Shipping Box, A1200	* = 0.25
364942-01	Packing Box, A1200	
365067-01	Main Assembly, US/CN	
365067-02	Main Assembly, GR/AU	
365067-03	Main Assembly, FR/BE	
365067-04	Main Assembly, SD/FN	
365067-05	Main Assembly, SP	
365067-06	Main Assembly, DN	
365067-07	Main Assembly, SW	
365067-08	Main Assembly, NR	
365067-09	Main Assembly, NE/AL/CEL	
365067-10	Main Assembly, UK	
365067-11	Main Assembly, IT	
365067-12	Main Assembly, PG	
1540025-01	Polybag, Anti-Static	
324257-01	Bag, Drying Agent	Place in PN 1540025-01
364057-01	End Capacitor, Set	
904778-01	RF Switch Box	
326189-01	RF Cable	
391029-01	Power Supply, UL/CSA	110V
391029-02	Power Supply, BSI	240V
391029-03	Power Supply, VDE	220V
391029-04	Power Supply, SEV	220V
391029-05	Power Supply, SAA	220V
251846-04	RF Cable	PAL
327124-05	Mouse Assembly	
390925-01	Cable, 25-Pin SCART to 23-Pin D-SUB	For TV connection
318143-02	Glue, White	

A1200 2M, (530318 Rev G) (cont'd)

368084-01	Seal, Tamper evident	Place on flaps of PN 364942-01
364346-01	Box, Accessory	
365016-01	Spacer	Use with PN 364346-01
369516-01	Label, UPC	
999104-01	Tape, Machine, 2" Clear	For box flaps of PN 364941-01
365057-01	Software Sub Assembly, Level 1, V3.0	English
365057-03	Software Sub Assembly, Level 1, V3.0	German
365057-02	Software Sub Assembly, Level 1, V3.0	French
365057-04	Software Sub Assembly, Level 1, V3.0	Italian
318896-04	Software License Agreement	English
318708-02	Software License Agreement	German
325349-01	Warranty Card, UK	
318365-04	Warranty Card, US	
318882-02	Warranty Card, CN	
320046-06	Warranty Card, GR	
325254-01	Warranty Card, FR	
368014-02	Warranty Card, AL	
312341-02	Disk Exchange Card, US	
318556-02	Disk Exchange Card, CN	
371110-01	Introducing the A1200, UK English	
368997-01	Introducing the A1200, English	
371000-01	Introducing the A1200, German	
368998-01	Introducing the A1200, French	
368999-01	Introducing the A1200, Italian	
371105-01	Introducing the A1200, Swedish	
318876-02	Service Center List, AL	
368997-03	Errata, Adapter	Multilingual
366648-01	Label, Bar Code, 0.5" x 1.75"	
371116-01	FTZ Statement	
371104-01	Introducing the A1200, Portuguese	
371106-01	Introducing the A1200, Spanish	
371107-01	Introducing the A1200, Norwegian	
371108-01	Introducing the A1200, Danish	

Chapter 5

System Specification

A1200/A1200HD Functional Specification

Introduction

The A1200 is a significantly enhanced version of the A600 which utilizes the Advanced Amiga Chip Set known as AA (pronounced 'double A'). Among new features to be discussed later in this document, the A1200 supports 8 bitplanes, allowing displays with 256 simultaneous colors chosen from a palette of 16,777,216 colors. In essence, the AA Chip Set consists of enhanced versions of AGNUS and DENISE, known respectively as ALICE and LISA. The A1200 represents Commodore's low end, low cost consumer version of an Advanced Amiga personal computer system, and is expected to be somewhat more costly to produce than the A600 in order to support the new AA features.

Basic Objectives

The main goal of the A1200 is to place a AA upgraded A600 hardware design into altered A600 casework which allows the use of a full size keyboard with numeric keypad. This is to be accomplished using existing components such as ALICE, LISA, and PAULA without the need for any new features. Given the above constraints, this is to be accomplished with the least possible cost premium over the A600.

Block Diagram

Refer to Figure 5-1 for the block diagram of the A1200 system.

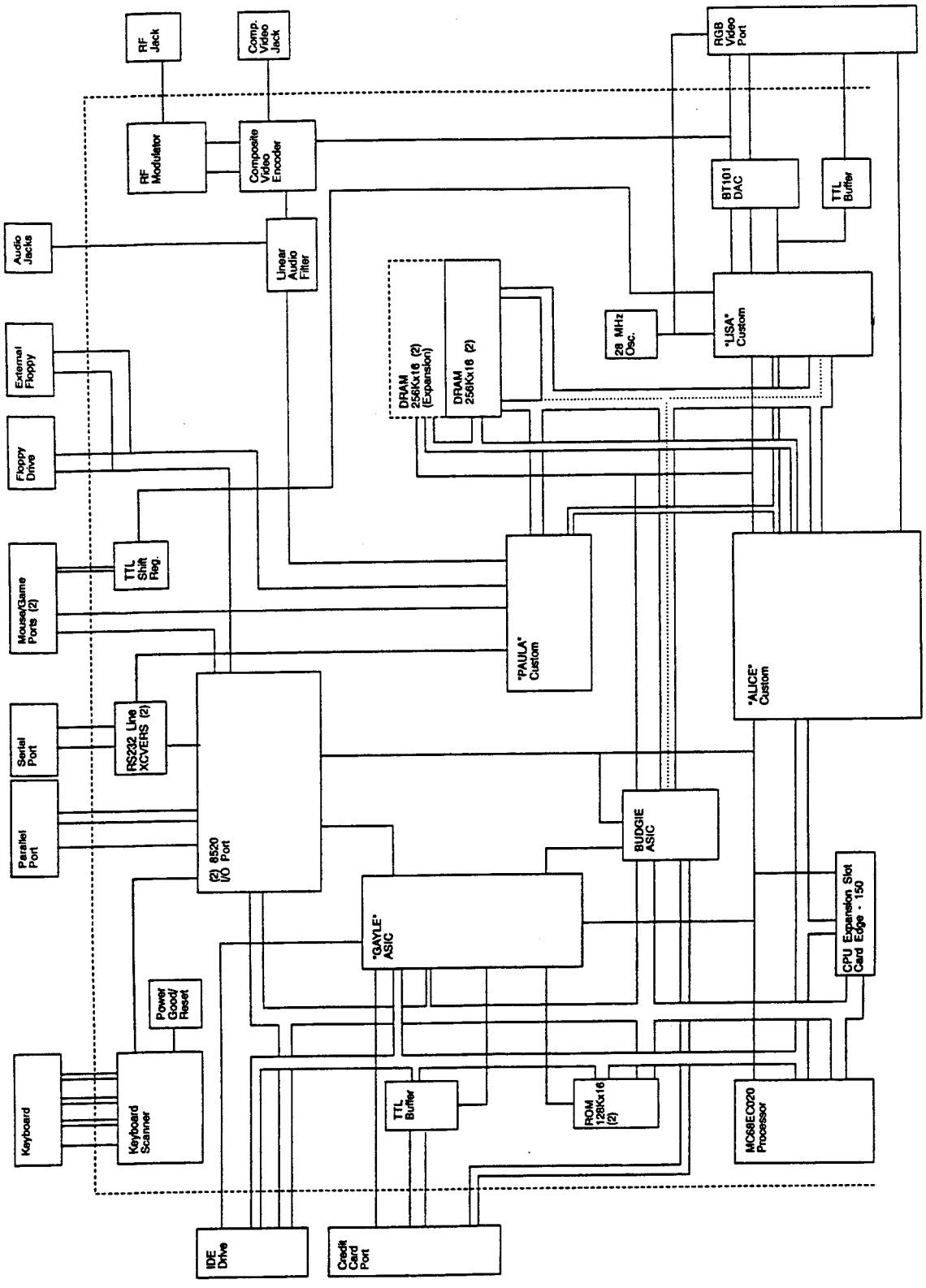


Figure 5-1. System Block Diagram

Features

CPU

- 14.32 MHz 68EC020 NTSC
- 14.18 MHz 68EC020 PAL
- 24-bit Address space
- 32-bit Data path

Memory and Expansion

- 1 Megabyte (1 MB) Chip Memory standard on motherboard organized as 256K x 32 bit
- Expandable to 2 MB Chip Memory with addition of 1 MB (256K x 32) A1201 Memory/Real-Time Clock (RTC) expansion card or Optional 1 Megabyte (1 MB) of Additional Chip Memory on motherboard for total of 2 MB Chip Memory (Systems are currently configured with 2 MB Chip Memory standard.)

ROM

- 512K AA Kickstart Mask ROM Version 3.00 standard organized as 128K x 32 bit
- 1 MB (256K x 32) and 2 MB (512K x 32) Mask ROMs also supported

Mass Storage

- Internal slim 3.5 inch Floppy Disk Drive (FDD) mounted on the right side of the unit like A600 with 880K formatted capacity
- Internal 2.5 inch IDE Hard Disk Drive (HDD) with 20 or 40 MB+ formatted capacity optional on A1200, standard on A1200HD unit

AA Custom Chips

The Advanced Amiga Chip Set enhances the video capabilities of the Amiga, while remaining backward compatible with the Amiga ECS Chip Set and retaining all of the graphics features characteristic of previous Amiga systems. The AA Chip Set consists of ALICE, LISA, and PAULA.

ALICE

ALICE is based on the 2 MB ECS AGNUS chip, and it continues to act as the main Amiga Chip bus controller. Although ALICE retains the same 16-bit data bus as the ECS AGNUS, it can now direct 32-bit and/or double-CAS page mode transactions on the Chip bus and has a stripped down interface to a 32-bit Chip memory bus. External logic is used for memory selection and decode.

LISA

LISA is a new full custom design replacement for DENISE implemented in 1.5μm CMOS technology. In addition to a 32-bit Chip interface, LISA improves video output to 24 bits of digital RGB video. Coupled with 80 ns DRAM, LISA can use double fetch cycles to obtain 64 bits of data in a single Chip bus cycle resulting in an overall four fold increase in Chip memory bandwidth for video.

PAULA

The same pre-ECS PAULA chip rounds out the AA Chip set lineup. PAULA continues to perform the same functions such as 8-bit audio with four voices configured as two stereo channels, floppy disk I/O, RS-232 serial I/O, potentiometer inputs, and interrupt control.

Note LISA requires the use of an industry standard, 30 MHz Triple 8-Bit Video DAC to generate analog RGB. See *AA Video Support* on page 5-5 for further details.

For information on ASICs which are required for use in conjunction with the AA Chip Set in the A1200, see *ASICs* on page 5-6.

AA Chip Set Feature Summary

The 32-bit wide data bus supports input of 32-bit bitplane data and allows the doubling of memory bandwidth. Additional doubling of bandwidth is achieved by using Fast Page Mode RAM. The same bandwidth enhancements are available for sprites. Also, the maximum number of bitplanes usable in all modes has increased to eight (8).

The Color Palette has been expanded to 256 colors deep and 25 bits wide (8 RED, 8 GREEN, 8 BLUE, 1 GENLOCK). This permits the display of 256 simultaneous colors in all resolutions. A palette of 16,777,216 colors is available in all resolutions.

28 MHz clock input allows for cleaner definition of HIRES and SHRES pixels. ALICE's clock generator is synchronized by means of LISA's 14 MHz and SCLK outputs. Genlock XCLK and /XCLKEN pins are handled with external logic.

A bitplane mask field of 8 bits allows an address offset into the color palette. Two 4-bit mask fields do the same for odd and even sprites.

In Dual Playfield modes, two 4-bitplane playfields are now possible in all resolutions.

Two Extra high-order playfield scroll bits allow seamless scrolling of up to 64-bit wide bitplanes in all resolutions. Resolution of bitplane scroll, display window, and horizontal sprite position has been improved to 35 ns in all resolutions.

A new 8-bitplane HAM mode has been created, 6 for colors and 2 for control bits. All HAM modes are available in all resolutions (not just LORES as before).

A reset input has been added which resets all the bits contained in registers new for ECS or LISA.

Sprite resolution can be set to LORES, HIRES, and SHRES independent of bitplane resolution. Attached Sprites are now available in all resolutions. A new register bit allows Sprites to appear in the screen border regions.

Hardware Scan Doubling support has been added for bitplanes and sprites. This is intended to allow 15 KHz screens to be intelligently displayed on a 31 KHz monitor, sharing the display with 31 KHz screens.

Video

Video Output

The A1200 will support the same external video connectors as the A600.

- Standard Amiga 23-pin Analog RGB, Digital RGBI
- Color composite video output (PAL or NTSC)
- RF Output for standard TV (PAL or NTSC)

As with the A600, while the PCB can accommodate either PAL or NTSC, the actual components placed on the board determine which of these two video standards is supported.

See Appendix A for information on the pinouts for these connectors.

AA Video Support

In order to display the 24 bits of digital RGB video output by LISA, the tried and true Video Hybrid circuit has been replaced by a triple 8-bit Video DAC, a Bt101 or equivalent.

System I/O

External System I/O

External Floppy, Serial, Parallel, Mouse, Joystick, and Stereo Audio ports are the same as the A600.

See "*External Connector Pinouts*" on page 5-9 for information on the pinouts for these ports.

Internal System I/O

Internal Floppy Signal and Power, IDE Signal and Power, are the same as the A600. The Keyboard Membrane has been extended to 31 pins to accommodate a full size keyboard with keypad. The keyboard status LEDs have been changed back to the larger A500 style power/status LEDs.

See "*Internal Connector Pinouts*" on page 5-12 for information on the pinouts for these connectors.

Expansion

PCMCIA PC Card Standard 2.0

The 68-pin PC Card 2.0 expansion interface remains unchanged from the A600 implementation. Memory and I/O cards are supported. The fastest access speed has been redefined to support no-wait state 14 MHz access with sufficiently fast SRAM cards.

A1201 or Memory Expansion/RTC

Two 40-pin DIL headers have been provided on the A1200 for a Memory/RTC expander. The A1201 Memory Expansion Card can have 1 MB of DRAM organized as 256K x 32 and/or a battery backed up RTC. On A1200s with 2 MB of DRAM on the motherboard, the unit may only provide a 22-pin header for RTC support. This card is installed through a removable top opening in the PCB shield.

150-Pin CPU Bus Expansion Card Edge

The new CPU bus expansion slot provides a well-defined, user-installable interface for expansion cards which implement "fast" memory or faster processors/coprocessors to enhance system performance, or which implement new functions such as DSPs, SCSI or network interfaces or other peripheral devices to extend the basic capabilities of the system.

See *Mechanical Appearance* on page 5-7 for further information.

ASICs

AA GAYLE

The AA GAYLE gate array is a derivative of the GAYLE used in the A600. Minor modifications are required for GAYLE to operate with ALICE since a decision was made to eliminate the /AS, /UDS, and /LDS pins from ALICE. Additional changes were needed to support the requirements of the 14 MHz 68EC020 processor.

Refer to the AA GAYLE specification for additional information.

BUDGIE

BUDGIE is a chip that serves as the main data path element in the A1200 system. It provides the interface between the 32-bit processor bus and the 32-bit Chip Memory bus, and generates the RAS and CAS select signals from the RAS and CAS timing signals that ALICE supports. It also provides a 16-bit bus buffer which can be used for either an expansion bus or in this case, the PCMCIA port data buffer. It also includes some miscellaneous functions, notably processor clock generation and 28 MHz/Genlock clock multiplexing.

It is implemented as a CMOS ASIC in a 128-pin SMT package. Internally, the data path element is similar to BRIDGETTE or the bus buffer/bridge logic implemented on the A4000 system. Data can be routed to/from the 32-bit processor port to either half of the 32-bit Chip Memory bus. Data can be bridged from the low order half of the Chip Memory bus to the high order half to support 16-bit Amiga chip accesses. Data read from memory is latched to meet the processor data hold requirements. CAS select logic is used to prevent contention when bridging the two halves of the chip bus.

The spare 16-bit expansion port (used for PCMCIA duty in the A1200) provides a simple path to/from the 16-bit processor port. The direction is dependent on the X-NOR of R_W and _BGACK signals to support either expansion bus or several purpose buffer requirements.

The memory decoding takes the RAS and CAS timing signals provided by ALICE and the multiplexed address bus and generates appropriate selection for 32-bit accesses. It also uses A1/A0 and SIZ1/SIZ0 on processor accesses to do the right decoding there.

It supports 2 banks of 32-bit memory with 9-bit addressing for a total of 2 MB of Chip Memory. RAS selection is used for bank selection. CAS selection is used for byte write control and to avoid contention on bridged reads. Refresh is done with CAS before RAS and the logic must assert all RAS and CAS signals during refresh cycles.

The processor clock generation simply X-NORS the 7 MHz and /CDAC clocks to generate a 14 MHz processor clock. The 28 MHz/Genlock clock multiplexor is a simple 2-input multiplexor. It has no connection with the rest of the logic and can be used for other functions if desired. The CCK/4 output is provided for the PAL color burst generation circuitry.

Keyboard Microprocessor

The existing 6500/1 keyboard MPU, used in previous systems, has been replaced by a CMOS Motorola 68HC05C4A MPU. This part provides a simpler implementation and reduces power requirements.

A1200 Power Supply

The A1200 uses the same power supply as the A600. The power connector is compatible with the A500 power supply if a higher rating is required. Specifications are as follows:

Output Voltage	Current (max)
+5V	3.0 A
+12V	500 mA
-12V	100 mA

See *"Power Connector (5 Pin Square DIN)"* on page 5-12 for information on the power supply connector pinout.

Mechanical/Appearance

Externally, the A1200 looks similar to the A600 except for the nameplate, but it is elongated in order to accommodate a full size keyboard. However, the A1200 has the same external connectors, HD assembly, and Floppy Disk assembly as the A600. Internally, a hatch is provided in the PCB shield for the installation of an A1201 Memory/RTC expander.

Also, the A1200 provides a large, internal CPU expansion card edge accessible from the bottom of the system, roughly similar in physical details to the A501 on the A500. In addition, an "extra" DB25 sized connector position is provided on the right rear of the unit. A wiring channel is provided to allow for the external connection of expansion slot devices.

A1200 Memory Map

Address	Size	
000000 to 1FFFFF	2 MB	Chip RAM (or system ROM overlay)
200000 to 5FFFFF	4 MB	Zorro II expansion space
600000 to 9FFFFF	4 MB	Credit Card memory if CC present
A00000 to A1FFFF	128 KB	Credit Card attributes
A20000 to A3FFFF	128 KB	Credit Card I/O
A40000 to A5FFFF	128 KB	Credit Card bits
A60000 to A7FFFF	128 KB	PC I/O
A80000 to B7FFFF	1 MB	System ROM selected
B80000 to BEFFFF	448 KB	Not used
BF0000 to BFFFFF	64 KB	8520 CIAs
C00000 to CFFFFF	1 MB	C00000 Memory
D00000 to D7FFFF	512 KB	PC Memory
D80000 to D8FFFF	64 KB	SPARE chip select
D90000 to D9FFFF	64 KB	ARCNET chip select
DA0000 to DA3FFF	16 KB	IDE drive
DA4000 to DA4FFF	16 KB	IDE reserved
DA8000 to DAFFFF	32 KB	Credit Card and IDE config registers
DB0000 to DBFFFF	64 KB	Not used (reserved for external IDE)
DC0000 to DCFFFF	64 KB	Real Time Clock (RTC)
DD0000 to DDFFFF	64 KB	Reserved for DMA controller
DE0000 to DEFFFF	64 KB	Not used
DF0000 to DFFFFF	64 KB	Chip registers
E00000 to E7FFFF	512 KB	System ROM (first half if 1 MB ROM)
E80000 to EFFFFF	512 KB	Configuration and I/O card space
F00000 to F7FFFF	512 KB	Flash ROM space
F80000 to FFFFFF	512 KB	System ROM (second half if 1 MB ROM)

Environmental Specification

Refer to Commodore Engineering Policy Document# 1.02.010, "*Product Environmental Requirements*".

External Connector Pinouts

Video Connectors

RGB Video (DB23 Male)

Pin	Signal Name	Pin	Signal Name
1	XCLK	11	/HSYNC
2	/XCLKEN	12	/VSYNC
3	Analog Red	13	Ground
4	Analog Green	14	Pixel Switch
5	Analog Blue	15	CCK
6	Digital Intensity	16-20	Video Ground
7	Digital Blue	21	-12V
8	Digital Green	22	+12V
9	Digital Red	23	+5V
10	/CSYNC		

Color Composite Video (RCA Jack)

Pin	Signal Name	Pin	Signal Name
1	Ground	2	Composite Video Out

RF Modulator (RCA Phono Jack, Channel Select SW)

Pin	Signal Name	Pin	Signal Name
1	Ground	2	RF Output

External System I/O

Floppy Port (DB23 Female)

Pin	Signal Name	Pin	Signal Name
1	/RDY	15	/TRK0
2	/DKRD	16	/DKWEB
3-7	Ground	17	/DKWDB
8	/MTRX	18	/STEP
9	/SEL2	19	DIR
10	/RESET	20	/SEL3
11	/CHNG	21	/SEL1
12	+5V	22	/INDEX
13	SIDE	23	+12V
14	/WPROT		

Serial Port (DB25 Male)

Pin	Signal Name	Pin	Signal Name
1	No connect	10	-12V
2	TxD	11	Audio Out
3	RxD	12-17	No connect
4	RTS	18	Audio In
5	CTS	19	No connect
6	DSR	20	DTR
7	Ground	21	No connect
8	CD	22	RI
9	+12V	23-25	No connect

Stereo Audio Ports

Audio Left (RCA Jack) **Audio Right (RCA Jack)**

Pin	Signal Name	Pin	Signal Name
1	Shorting Bar to Right	1	Shorting Bar to Left
2	Left Audio Channel	2	Right Audio Channel
3	Ground	3	Ground

Parallel Port (DB25 Female)

Pin	Signal Name	Pin	Signal Name
1	/STROBE	10	/ACK
2	Data 0	11	BUSY
3	Data 1	12	POUT
4	Data 2	13	SEL
5	Data 3	14	/AUTO(+5V)
6	Data 4	15	No connect
7	Data 5	16	/INIT(/RESET)
8	Data 6	17-25	Ground
9	Data 7		

Mouse/Game Ports

Mouse Ports(1 and 2) (DB9 Male)

Pin	Signal Name	Pin	Signal Name
1	V Pulse	6	Left Button
2	H Pulse	7	+5V
3	VQ Pulse	8	Ground
4	VH Pulse	9	Right Button
5	Middle Button		

Joystick Ports(1 and 2) (DB9 Male)

Pin	Signal Name	Pin	Signal Name
1	/Forward	6	/Fire
2	/Back	7	+5V
3	/Left	8	Ground
4	/Right	9	Pot Y
5	Pot X		

Light Pen Port(2 only) (DB9 Male)

Pin	Signal Name	Pin	Signal Name
1		6	/Light Pen
2		7	+5V
3		8	Ground
4		9	
5	Light Pen Press		

Power Connector (5 Pin Square DIN)

Pin	Signal Name	Pin	Signal Name
1	+5V	4	Ground
2	Shield Ground	5	-12V
3	+12V		

Internal Connector Pinouts

Internal System I/O

Internal Floppy Signal (Header, 34 Pin DIL)

Pin	Signal Name	Pin	Signal Name
1	Ground	16	/MTRO
2	/CHNG	18	DIR
3	KEY	20	/STEP
4	/MTR0	22	/DKWDB
5-33 odd	Ground	24	/DKWEB
6	No connect	26	/TRK0
8	/INDEX	28	/WPROT
10	/SEL0	30	/DKRD
12	/SEL1	32	/SIDE
14	No connect	34	/RDY

Internal Floppy Power (Header, 4 Pin SIL)

Pin	Signal Name	Pin	Signal Name
1	+5V	3	Ground
2	Ground	4	+12V

Internal IDE Signal/Power (Header, 44 Pin DIL)

Pin	Signal Name	Pin	Signal Name
1	/Reset	23	/IOWR
2	Ground	24	Ground
3	D31	25	/IORD
4	D16	26	Ground
5	D30	27	/WAIT
6	D17	28	No connect
7	D29	29	No connect
8	D18	30	Ground
9	D28	31	/IDE_IRQ
10	D19	32	No connect
11	D27	33	A3
12	D20	34	No connect
13	D26	35	A2
14	D21	36	A4
15	D25	37	/IDE_CS(1)
16	D22	38	/IDE_CS(2)
17	D24	39	/IDE_LED
18	D23	40	Ground
19	Ground	41	VCC
20	(keypin)	42	VCC
21	No connect	43	Ground
22	Ground	44	Pulled up to VCC

Keyboard Membrane (31 Pin Locking ZIF, FFC)

Pin	Signal Name	Pin	Signal Name
1	Row 2	17	Column 12
2	Row 3	18	Column 11
3	Row 4	19	Column 10
4	Row 5	20	Column 9
5	Row 1	21	Column 8
6	Right Shift	22	Column 7
7	Row 0	23	Column 6
8	Right Alt	24	Column 5
9	VCC	25	Column 4
10	Right Amiga	26	Column 3
11	CTRL	27	Column 2
12	Left Shift	28	Column 1
13	Left Alt	29	Column 0
14	Left Amiga	30	Ground
15	Column 14	31	LED
16	Column 13		

Internal Keyboard LEDS (Header, 5 Pin SIL, keyed)

Pin	Signal Name	Pin	Signal Name
1	/POWER_LED	4	NC
2	/FLOPPY_LED	5	GND
3	/IDE_LED		

Expansion Connector Pinouts

PCMCIA PC Card 2.0 (68 Pin Rt. Angle)

Pin	Signal Name	Pin	Signal Name
1	Ground	35	Ground
2	D3	36	CD1-
3	D4	37	D11
4	D5	38	D12
5	D6	39	D13
6	D7	40	D14
7	CE1-	41	D15
8	A10	42	CE2-
9	OE-	43	RFSH
10	A11	44	RFU/IORD-
11	A9	45	RFU/IOWR-
12	A8	46	A17
13	A13	47	A18
14	A14	48	A19
15	WE-/PGM-	49	A20
16	BSY-/IREQ-	50	A21
17	VCC	51	VCC
18	VPP1	52	VPP2
19	A16	53	A22
20	A15	54	A23
21	A12	55	A24
22	A7	56	A25
23	A6	57	RFU
24	A5	58	RESET
25	A4	59	WAIT-
26	A3	60	RFU/INPACK-
27	A2	61	REG-
28	A1	62	BVD2/SPKR-
29	A0	63	BVD1/STSCHG-
30	D0	64	D8
31	D1	65	D9
32	D2	66	D10
33	WP/IOIS16-	67	CD2-
34	Ground	68	Ground

Block Diagrams

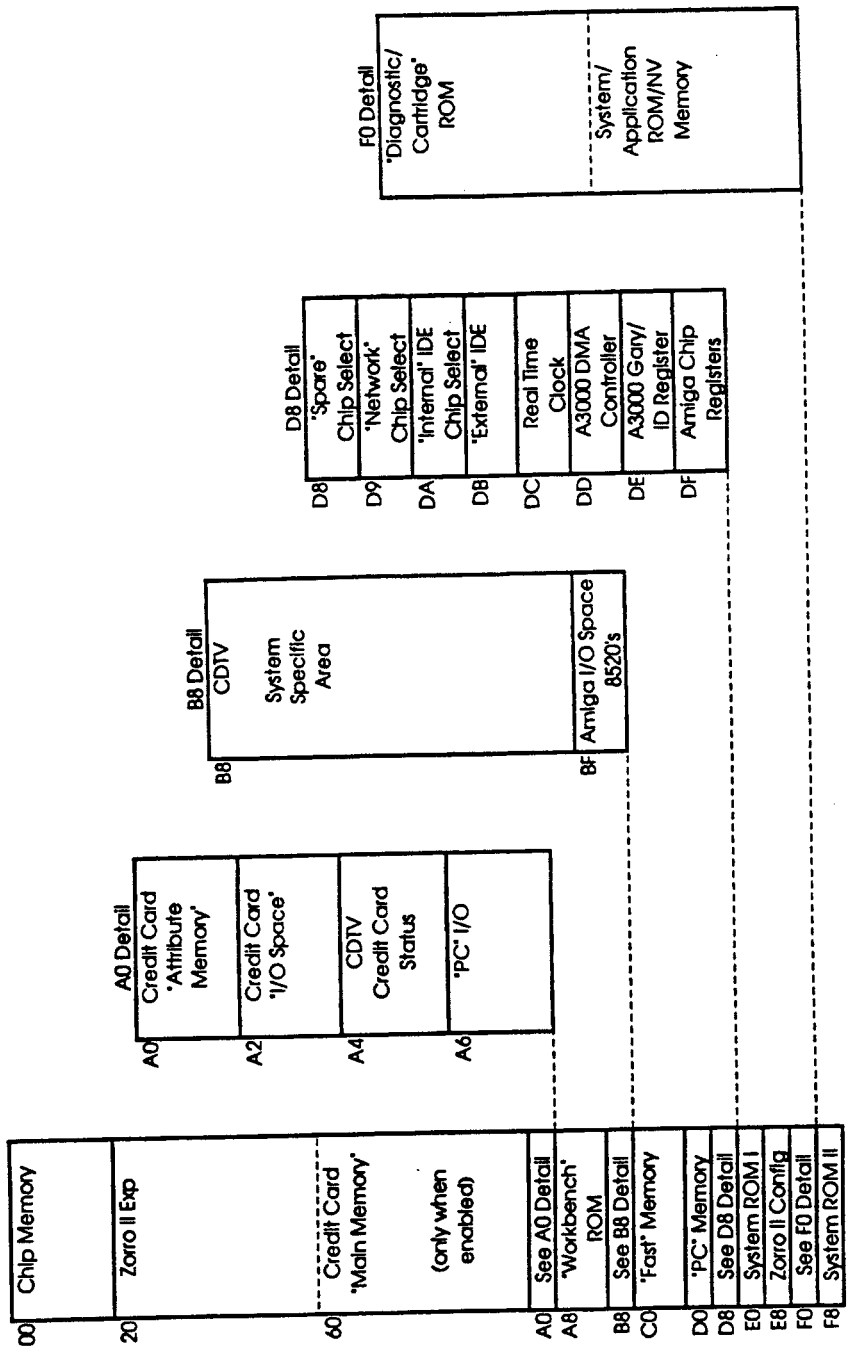


Figure 5-2. A1200 Memory Map

150-Pin Card Edge Connector

Pin	Name	Pin	Name
1	A31	40	+5VDC
2	A30	41	D31
3	A29	42	D30
4	A28	43	D29
5	A27	44	D28
6	A26	45	D27
7	A25	46	D26
8	A24	47	D25
9	GND	48	D24
10	+5VDC	49	GND
11	A23	50	+5VDC
12	A22	51	D23
13	A21	52	D22
14	A20	53	D21
15	A19	54	D20
16	A18	55	D19
17	A17	56	D18
18	A16	57	D17
19	GND	58	D16
20	+5VDC	59	GND
21	A15	60	+5VDC
22	A14	61	D15
23	A13	62	D14
24	A12	63	D13
25	A11	64	D12
26	A10	65	D11
27	A9	66	D10
28	A8	67	D9
29	GND	68	D8
30	+5VDC	69	GND
31	A7	70	+5VDC
32	A6	71	D7
33	A5	72	D6
34	A4	73	D5
35	A3	74	D4
36	A2	75	D3
37	A1	76	D2
38	A0	77	D1
39	GND	78	D0

Pin (cont'd)	Name (cont'd)	Pin (cont'd)	Name (cont'd)
79	GND	115	/FPUCS
80	+5VDC	116	/FPUSENSE
81	/IPL2	117	CCKA
82	/IPL1	118	/RESET
83	/IPL0	119	GND
84	Reserved for Future Use	120	+5VDC
85	/RST	121	/NETCS
86	/HLT	122	/SPARECS
87	Reserved for Future Use	123	/RTCCS
88	Reserved for Future Use	124	/FLASH
89	SIZE1	125	/REG
90	SIZE0	126	/CCENA
91	/AS	127	/WAIT
92	/DS	128	/KBRESET
93	R/W	129	/IORD
94	/BEER	130	/IOWR
95	Reserved for Future Use	131	/OE
96	/AVEC	132	/WE
97	/DSACK1	133	/OVR
98	/DSACK0	134	XRDY
99	CPUCLKA	135	/ZORRO
100	E	136	/WIDE
101	GND	137	/INT2
102	+5VDC	138	/INT6
103	FC2	139	GND
104	FC1	140	+5VDC
105	FC0	141	SYSTEM1(GND)
106	/RMC	142	SYSTEM0(GND)
107	Reserved for Future Use	143	/xRxD
108	Reserved for Future Use	144	/xTxD
109	Reserved for Future Use	145	/CONFIG OUT(GND)
110	Reserved for Future Use	146	AUDIO GND
111	/BR	147	AUDIO LEFT
112	/BG	148	AUDIO RIGHT
113	Reserved for Future Use	149	+12VDC
114	/BOSS	150	-12VDC

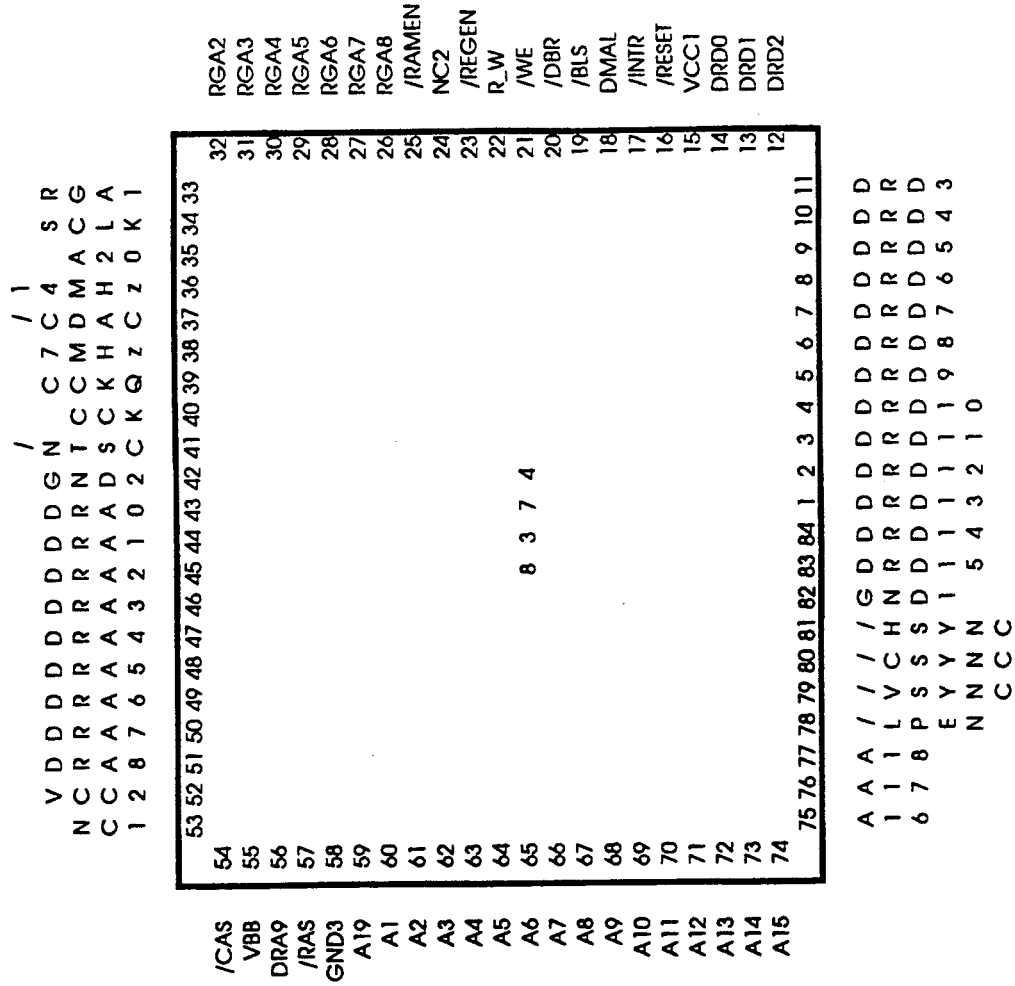


Figure 5-3. ALICE

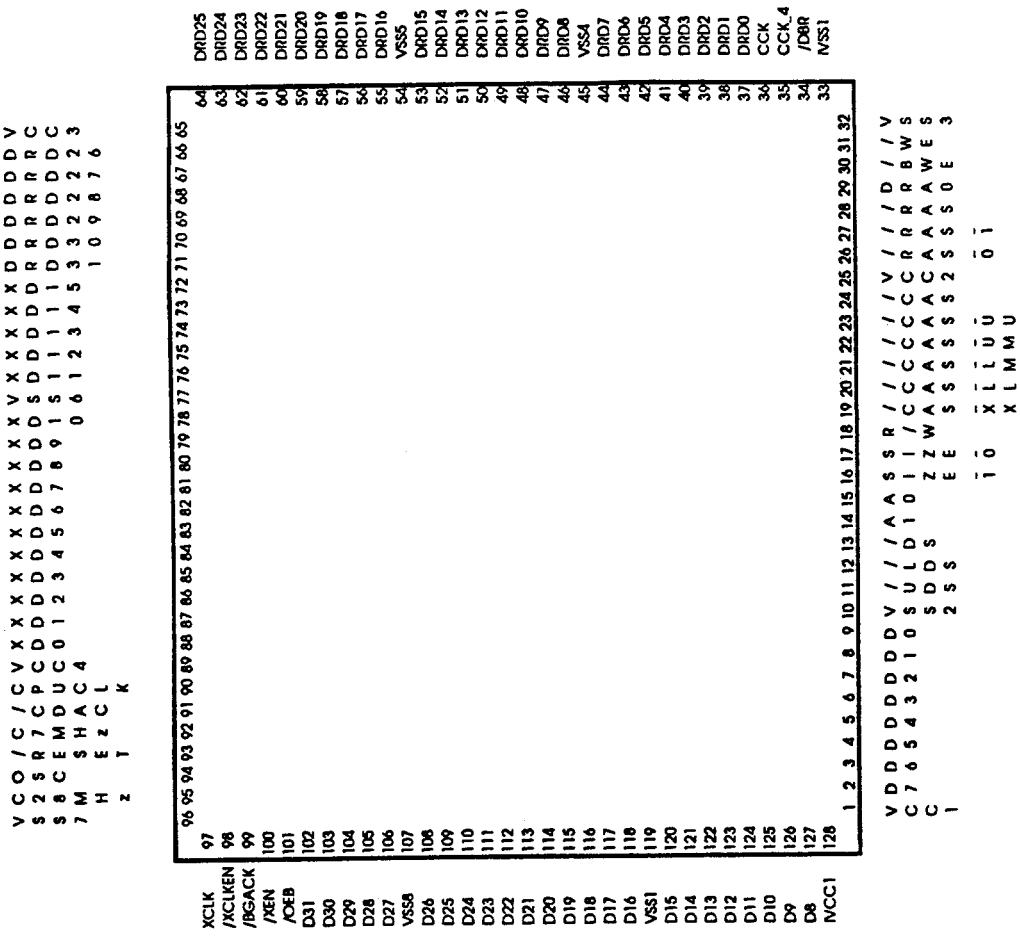


Figure 5-4. BUDGIE

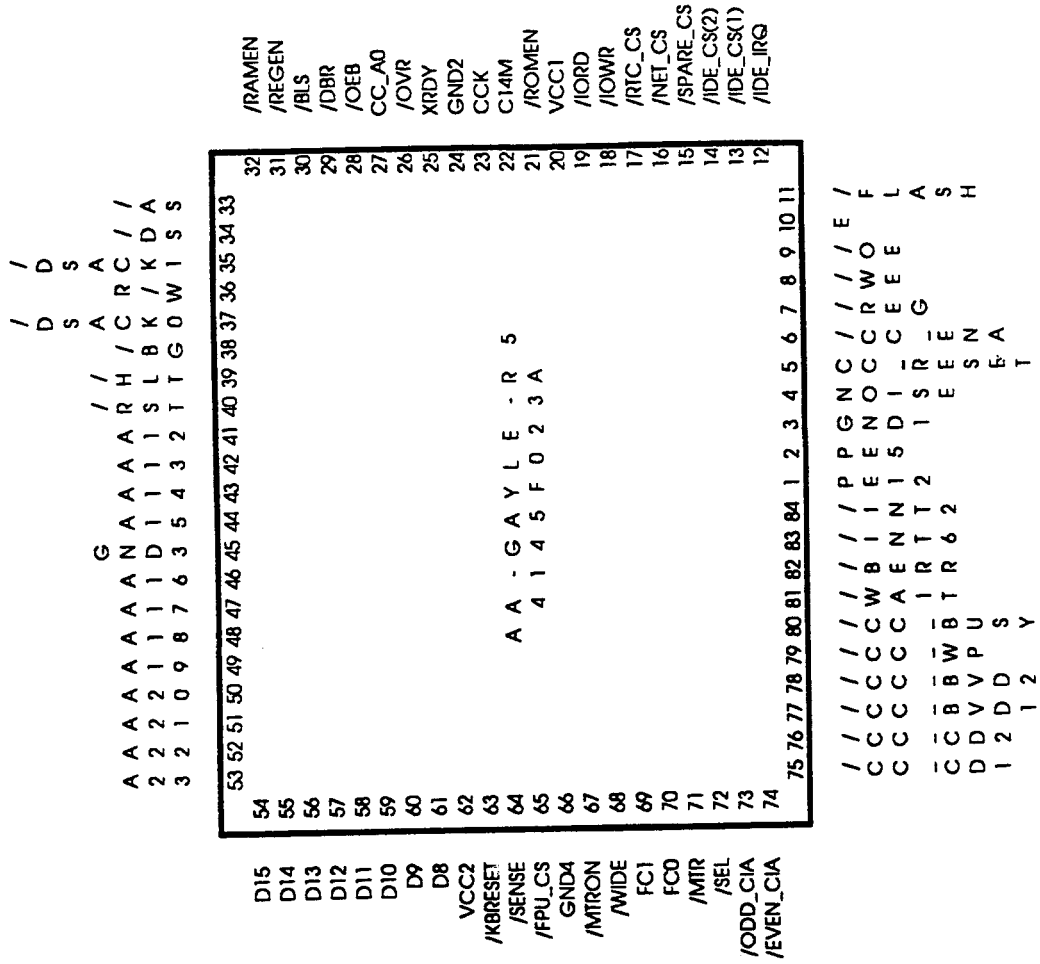
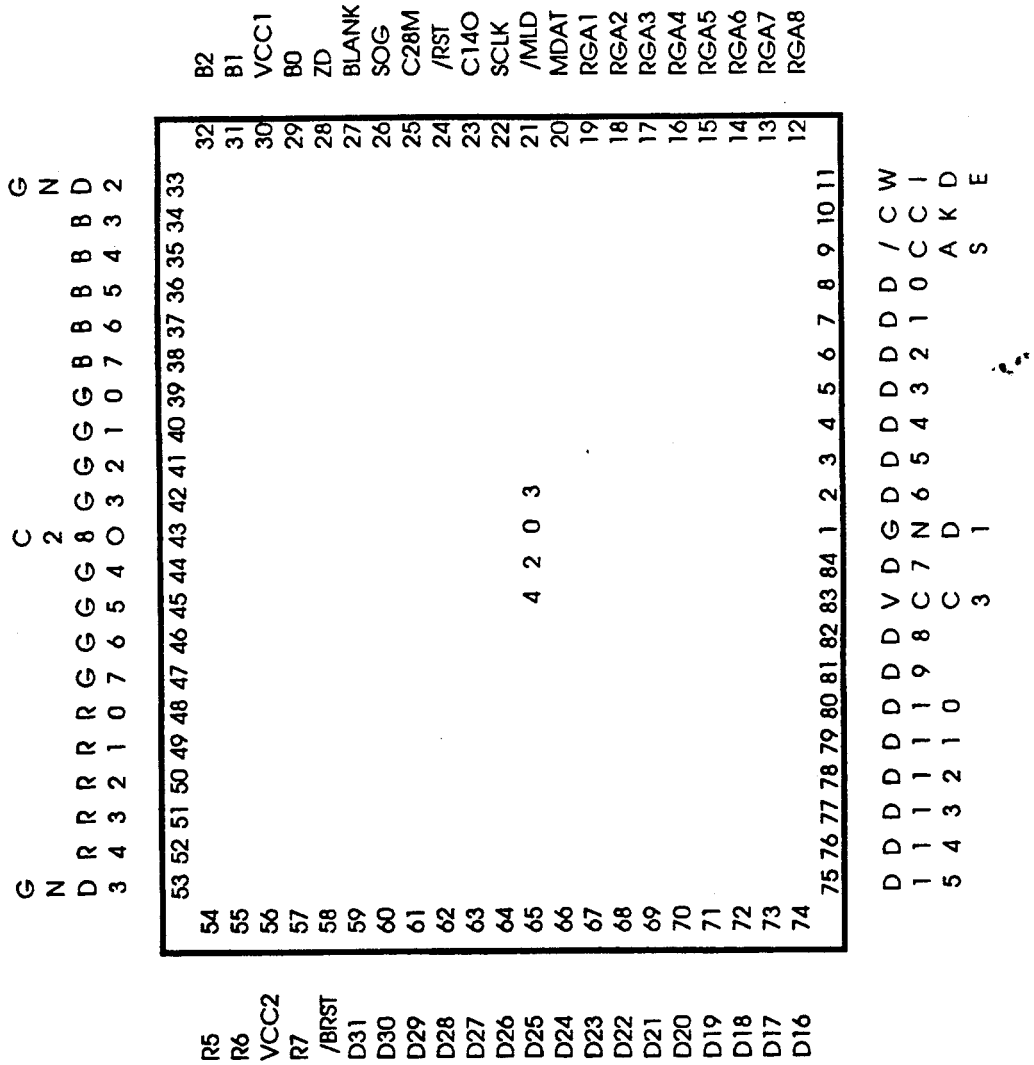


Figure 5-5. AA-GAYLE


GND
DR3 R4 R5 R6 R7 GND GND GND

Chapter 6

Schematics

A1200 PCB Assembly Schematics

The PCB assembly schematics include the following:

- Directories and revision history
- Processor
- Memory
- Lisa/Video
- Paula
- Video/Audio
- Serial and parallel ports
- Floppy Drive
- Keyboard
- ROM
- Credit card
- Memory expansion and IDE drive
- Power distribution and decoupling

REVISION HISTORY

REV	DESCRIPTION	DATE	APRVL	MANAGER
0	ENGINEERING PROTOTYPE	03/13/92	CRR	
1	ADVANCE ENGINEERING RELEASE	06/29/92	CRR	
A	PILOT PRODUCTION RELEASE	09/09/92	CRR	
B	REVISED PER ECO #20695	11-13-92	DSL	

JUMPERS AND STUFF

REF	TYPE	DESCRIPTION	PAGE
R246	SMT	NTSC COLOR BURST	4
R202	SMT	PAL COLOR BURST	4
R625	SMT	KEYBOARD MPU CLOCK	9
R624	SMT	KEYBOARD/SYSTEM RESET	9

CONNECTORS

REF	TYPE	DESCRIPTION	PAGE
CN1	DB9P	MOUSE/JOYSTICK 1	5
CN2	DB9P	MOUSE/JOYSTICK 2	5
CN3	RCA-J	RIGHT AUDIO OUTPUT	5
CN4	RCA-J	LEFT AUDIO OUTPUT	5
CN5	DB23S	EXTERNAL FLOPPY	8
CN6	DB25P	RS232 SERIAL PORT	7
CN7	DB25S	PARALLEL PRINTER PORT	7
CN8	SQ DIN	POWER SUPPLY CONNECTOR	13
CN9	DB23P	VIDEO OUTPUT	6
CN10	RCA-J	COMPOSITE VIDEO	4
CN11	DIL-34	INTERNAL FLOPPY SIGNAL	8
CN12	SIL-4	INTERNAL FLOPPY POWER	8
CN13	MEM-30	KEYBOARD MEMBRANE	9
CN14	SIL-4	INTERNAL FLOPPY POWER	8
CN13	MEM-30	KEYBOARD MEMBRANE	9
CN14	SIL-4	KEYBOARD STATUS LED'S	9
CN15	PCMCIA	PC "MEMORY CARD"	11
P9	EDGE-80	MEMORY BUS EXPANSION	12

SIGNAL GLOSSARY

SIGNAL	DESCRIPTION (AREA)	PAGES
28MHZ	28.63636 MHZ MASTER CLOCK	
7MHZ	7.15909 MHZ PROCESSOR CLOCK	
A[23:1]	PROCESSOR ADDRESS BUS (68000)	
ACK	DATA ACKNOWLEDGE (PARALLEL PORT)	
AS	ADDRESS STROBE (68000)	
AUDIN	AUDIO INPUT (RS232 PORT)	
AUDOUT	AUDIO OUTPUT (RS232 JACK)	
BERR	BUS ERROR (68000)	
BG	BUS GRANT (68000)	
BGACK	BUS GRANT ACKNOWLEDGE (68000)	
BLISS	BLITTER SLOWDOWN (CHIPS)	
BLIT	CHIP MEMORY ACCESS (CHIPS)	
BR	BUS REQUEST (68000)	
BUSY	DEVICE BUSY (PARALLEL PORT)	
CAS[/U	COLUMN ADDRESS STROBE (DRAM)	
CCK/CCKQ	COLOR CLOCK / QUADRATURE (CHIPS)	
CDAC	7.15909 MHZ QUADRATURE CLOCK (CHIPS)	
CHNG	MEDIA CHANGE (FLOPPY)	
CLKRD/WR	READ-TIME CLOCK READ / WRITE (RTC)	
COMP	MONOCHROME COMPOSITE VIDEO (VIDEO)	
CSYNC	COMPOSITE SYNC (VIDEO)	
CTS	CLEAR TO SEND (RS232 PORT)	
D[15:0]	PROCESSOR DATA BUS (68000)	
DIR	STEP DIRECTION (FLOPPY)	
DKRD	DISK READ DATA (FLOPPY)	
DKWD	DISK WRITE DATA (FLOPPY)	
DKWE	DISK WRITE ENABLE (FLOPPY)	
DMAI	CHIP DMA REQUEST LINE (CHIPS)	
DRA[8:0]	DRAM ADDRESS BUS (DRAM)	
DRD[15:0]	DRAM DATA BUS (DRAM)	
DSR	DATA SET READY (RS232 PORT)	
DTACK	DATA TRANSFER ACKNOWLEDGE (68000)	
DTR	DATA TERMINAL READY (RS232 PORT)	
E	PERIPHERAL ENABLE CLOCK (68000)	
EXTICK	EXPANSION PRESENT / RTC TICK	
FC[2:0]	FUNCTION CODE (68000)	
FIRE0/1	FIRE BUTTON 0/1 (JOYSTICKS)	
HLT	PROCESSOR HALT (68000)	
HSYNC	HORIZONTAL SYNC (VIDEO)	
INDEX	INDEX PULSE (FLOPPY)	
INT[2,3,6]	INTERRUPT REQUEST (CHIPS)	
IORESET	I/O RESET	
IPL[2:0]	INTERRUPT PRIORITY LEVEL (68000)	
KBCLOCK	KEYBOARD CLOCK (KEYBOARD)	
KBDATA	KEYBOARD DATA (KEYBOARD)	
KBRESET	KEYBOARD RESET (KEYBOARD)	
LDS/UDS	UPPER / LOWER DATA STROBES (68000)	
LED	POWER ON LED / AUDIO FILTER DISABLE	
LEFT/RIGHT	LEFT RIGHT AUDIO (AUDIO)	

SIGNAL	DESCRIPTION (AREA)	PAGES
LPEN	LIGHT PEN TRIGGER (JOYSTICKS)	
MTR	MOTOR ON (FLOPPY)	
MTR0	MOTOR ON - DRIVE 0 (FLOPPY)	
MOV/MOH	MOUSE 0 QUADRATURE V/H (JOYSTICKS)	
M1V/M1H	MOUSE 1 QUADRATURE V/H (JOYSTICKS)	
OVL	OVERLAY ROM OVER RAM	
OVR	OVERRIDE SYSTEM DECODING	
PIXELSW	GENLOCK PIXEL SWITCH (VIDEO)	
POT0X/0Y	POT LINES 0 X/Y (JOYSTICKS)	
POT1X/1Y	POT LINES 1 X/Y (JOYSTICKS)	
POUT	PAPER OUT (PARALLEL PORT)	
PPD[7:0]	PARALLEL PORT DATA (PARALLEL PORT)	
RAMEN	RAM ENABLE (CHIPS)	
REGEN	CHIP REGISTER ENABLE (CHIPS)	
RAS0/1	ROW ADDRESS STROBE (DRAM)	
RDY	DRIVE READY (FLOPPY)	
RESET	GENERAL RESET	
RGA[8:1]	REGISTER ADDRESS BUS (CHIPS)	
R/G/B	RED / GREEN / BLUE (VIDEO)	
RI	RING INDICATE (RS232 PORT)	
ROMEN	ROM ENABLE (ROM)	
RTS	REQUEST TO SEND (RS232 PORT)	
RST	PROCESSOR RESET (68000)	
RXD	RECEIVE DATA (RS232 PORT)	
RW	PROCESSOR READ/WRITE (68000)	
SEL	SELECT (PARALLEL PORT)	
SEL[3:0]	DRIVE SELECT (FLOPPY)	
SIDE	SIDE SELECT (FLOPPY)	
STEP	STEP IN/OUT COMMAND (FLOPPY)	
TRK0	TRACK ZERO SENSE (FLOPPY)	
TXD	TRANSMIT DATA (RS232 PORT)	
VMA	VALID MEMORY ADDRESS (68000)	
VPA	VALID PERIPHERAL ADDRESS (68000)	
VSYNC	VERTICAL SYNC (VIDEO)	
WE	WRITE ENABLE (DRAM)	
WPROT	WRITE PROTECT SENSE (FLOPPY)	
XCLK	EXTERNAL GENLOCK CLOCK (VIDEO)	
XCLKEN	EXTERNAL CLOCK ENABLE (VIDEO)	
XRDY	EXTERNAL DATA READY	
	** CREDIT CARD AND IDE STUFF? **	

KEY COMPONENTS

REF	CHIP	DESCRIPTION	PAGE
U1	68000	68000 PROCESSOR 16MHZ	2
U2	8374	ALICE (AA AGNUS)	2
U3	8364	PAULA	5
U4	4203	LISA (AA DENISE)	4
U5	F023A	AA GAYLE (CBM ASIC)	2,8,11
U6	ASST	ROM 512KX16. 150 NS	10
U7-8	8520	AMIGA VIA. 1 MHZ	7
U10-11	28F10	FLASH MEMORY 128KX8	10
U12	CXA1145	SONY VIDEO ENCODER	4
U13	68HC05	AMIGA KEYBOARD MPU	9
U49	PST518	LOW VOLTAGE SENSE IC	9
U15	LF347	BIMOS OP-AMP	5
	TL084	BICMOS OP-AMP	ALT
U16-17	ASST	DRAM 256KX16. 80NS	3
U18-19	ASST	DRAM 256KX16 OPTIONAL	3
U20	391???	BUDGIE (ASIC)	2
U28	1488	EIA LINE DRIVER	7
U29	1489	EIA LINE RECEIVER	7
U30	BT101	TRIPLE 8-BIT VIDEO DAC	4
X1	OSC	TTL 28.63636 MHZ NTSC	2
	OSC	TTL 28.37512 MHZ PAL	ALT
Y451	XTAL	4.43619MHZ PAL BURST	4
Y621	XTAL	3MHZ CERAMIC RESONATOR	9
X2	ASST	PAL VIDEO MODULATOR	4
	ASST	NTSC VIDEO MODULATOR	4

DIRECTORIES AND REVISION HISTORY

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COMMODORE
SCHEMATIC A1200 R1D
C/A1200 MAIN BOARD
"CHANNEL Z"
SIZE C | 364717 6
SCALE | SHEET 1 OF 13

A1200 REV 1->1D PCB

WEITAD GRAPHICS VAR SERVER 7.0

CHANNEL Z
10/10/92

D(31:0)
A(23:0)
FC(2:0)

OOPS!

ALL THIS STUFF SERVES TO CORRECT ONE MINOR GAYLE BUG AND A NUMBER OF ALICE DEFICIENCIES NOT YET CORRECTED.

ASSUMING THE CHANGES ARE IMPLEMENTED IN THE PRODUCTION GAULE CHIP. THEN ALL THIS SILLYNESS IS BEST ERASED...

REFERENCE	OLD GAYLE	NEW GAYLE
XU1	74F74	NONE
XU2	74F02	NONE
XU3	74F74	NONE
U26X	74F86	NONE
XJ4	0 OHM	OUT
XJ1	OUT	0 OHM
XJ2	OUT	0 OHM
XJ3	OUT	0 OHM
U26	NOTE	74LS86

U1 MC68EC020

U0 MC68881

U2 8374 ALICE

U5 4145F023A AA_GAYLE

XU9 OOPS! - 32-BIT / SLOW ROM
XJ9 IN - ADD ROM WAIT

CONTROL FUNCTIONS

PROCESSOR AND OTHER USEFUL COMPONENTS

NOTE: PAL USES 28.37516 MHZ

A1200 REV 1->1D PCB

NOTE: VARIOUS COMPONENTS ARE FOR EMI CONTROL AND MAY BE LOADED WITH FUNNY THINGS...

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COMMODORE
SCHEMATIC A1200 RIO
C/A1200 MAIN BOARD
CHANNEL Z*
SIZE C 364717 B
SCALE
SHEET 2 OF 13

DRD(31:0)

DRA(9:0)

D(31:0)

BDRA(8:0)

DRAM

U16

U17

U18
OPT

U19
OPT

256KX16

U18-19 OPTIONAL

U20

391425
BUDGIE

BRIDGE/DRAM PART

_RAS

_CAS

_DWE

_DBR

A(1)

A(0)

SIZE_1

SIZE_0

R_W

_DS

_OEB

_RST

_UDS

_LDS

RAS_1

RAS_0

CAS_UU

CAS_UM

CAS_LM

CAS_LL

BWE

CAS_XX

R151A R151B R151C R151D R151E R151F R151G R151H R151I

R152A R152B R152C R152D R152E R152F R152G R162 R163 R164

C152A C152B C152C C152D C152E C152F 22PF

R161 470

RDE

_BRAS(1)

_BRAS(0)

_BCAS_UU

_BCAS_UM

_BCAS_LM

_BCAS_LL

_BWE

_BCAS_XX

U18-19 OPTIONAL

VCC

C16A C16B C17A C17B C18A C18B C19A C19B 22UF

U16 U17 OPT U18 OPT U19 OPT

DECOUPLING

DECOUPLING

A1200 REV 1->1D PCB

MEMORY AND...WELL, I USED TO REMEMBER

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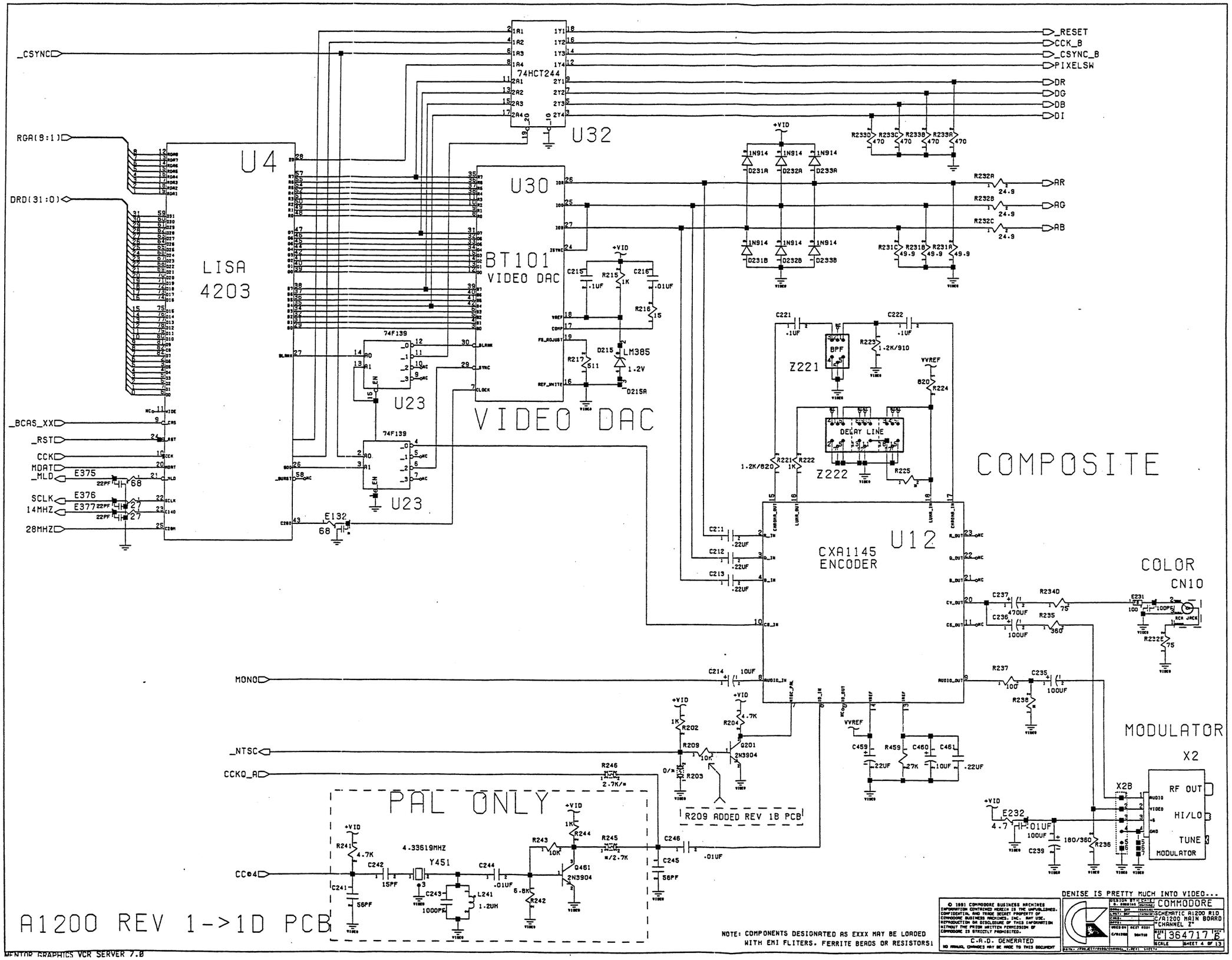
COMMODORE

SCHEMATIC A1200
C/A1200 MAIN BOARD
"CHANNEL Z"

SIZE C | 36471 | REV E

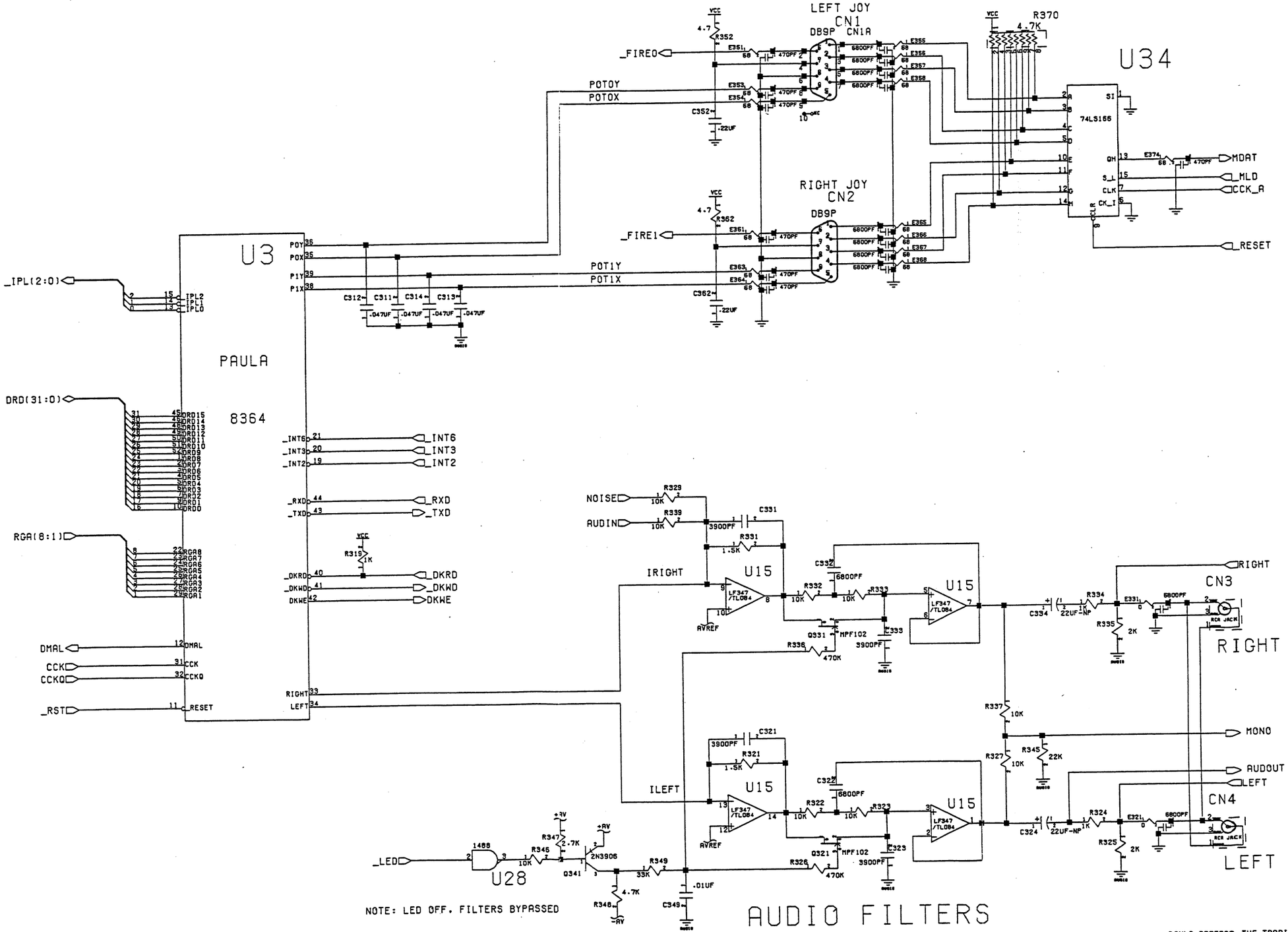
SCALE | SHEET 3 of 3

DESIGN ADDITIONS WERE SERVED 7 0

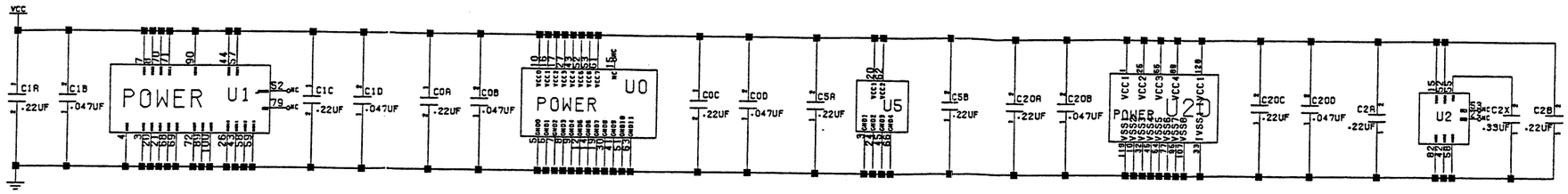


MENTOR GRAPHICS VCR SERVER 7.0

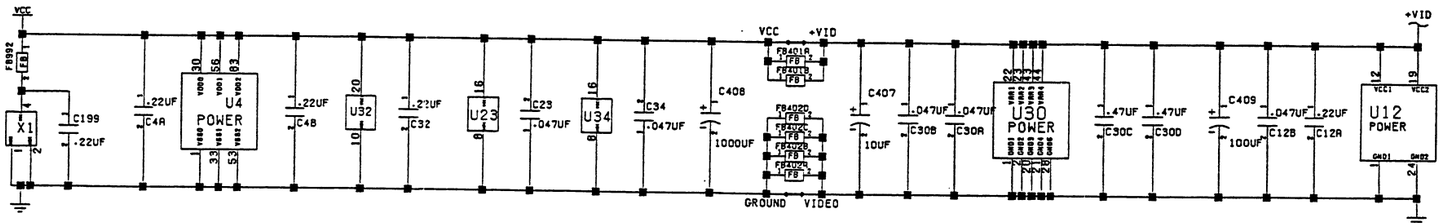
MOUSE/JOYSTICK PORTS



GENERAL DECOUPLING



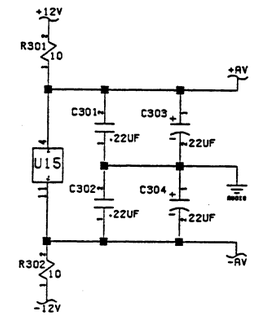
VIDEO DECOUPLING



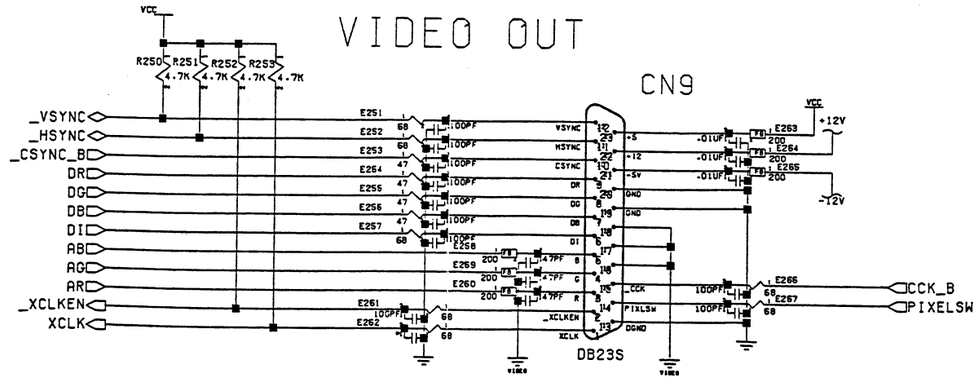
NOTE: AS OF REV 1C, LOGIC AND VIDEO GOUND AND POWER ARE
THE SAME NET. BUT REOUTED DISCRETELY EXCEPT AT DAC1

ALSO ADDED C30C AND C30D FOR OVERKILL DAC DECOUPLING.

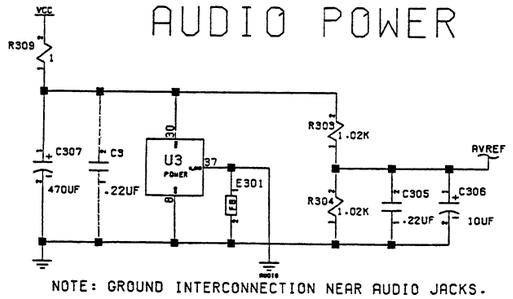
AUDIO DECOUPLING



VIDEO OUT



AUDIO POWER



NOTE: GROUND INTERCONNECTION NEAR AUDIO JACKS.

A1200 REV 1->1D PCB

PARTY OUT OF BOUNDS, WHAT A MESS...

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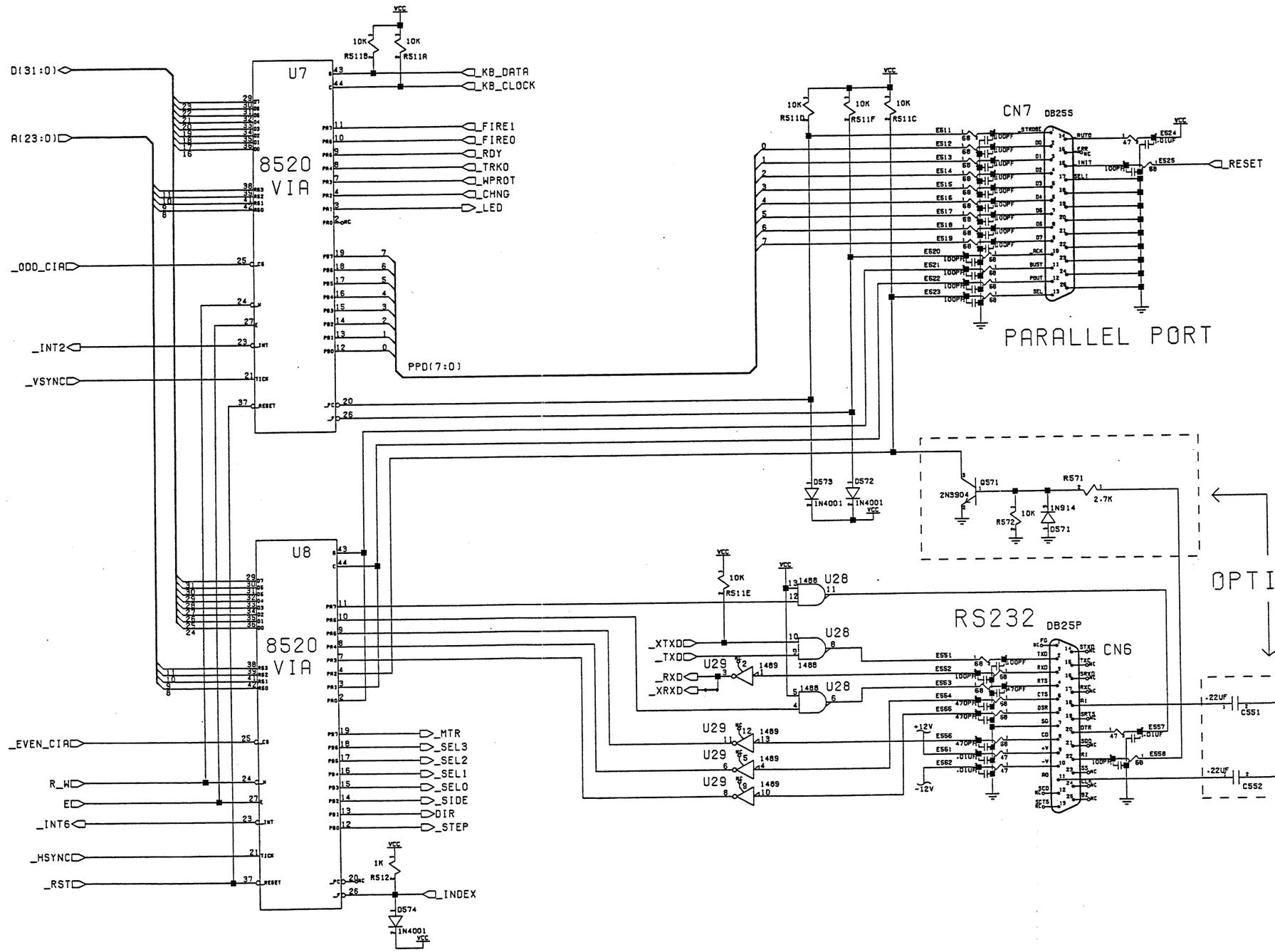
COMMODORE
SCHEMATIC A1200 R1D
C/A1200 MAIN BOARD
"CHANNEL Z"
SIZE C 364717 REV D
SCALE
SHEET 6 OF 13



A1200 REV 1->1D PCB

SERIAL AND PARALLEL PORTS

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COMMODORE

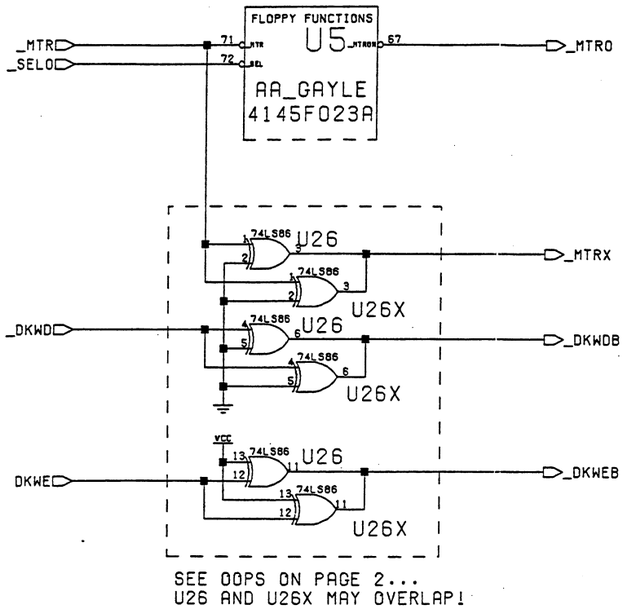
SCHEMATIC A1200 LD
C/A1200 MAIN BRD
"CHANNEL Z"

SIZE C 3647178

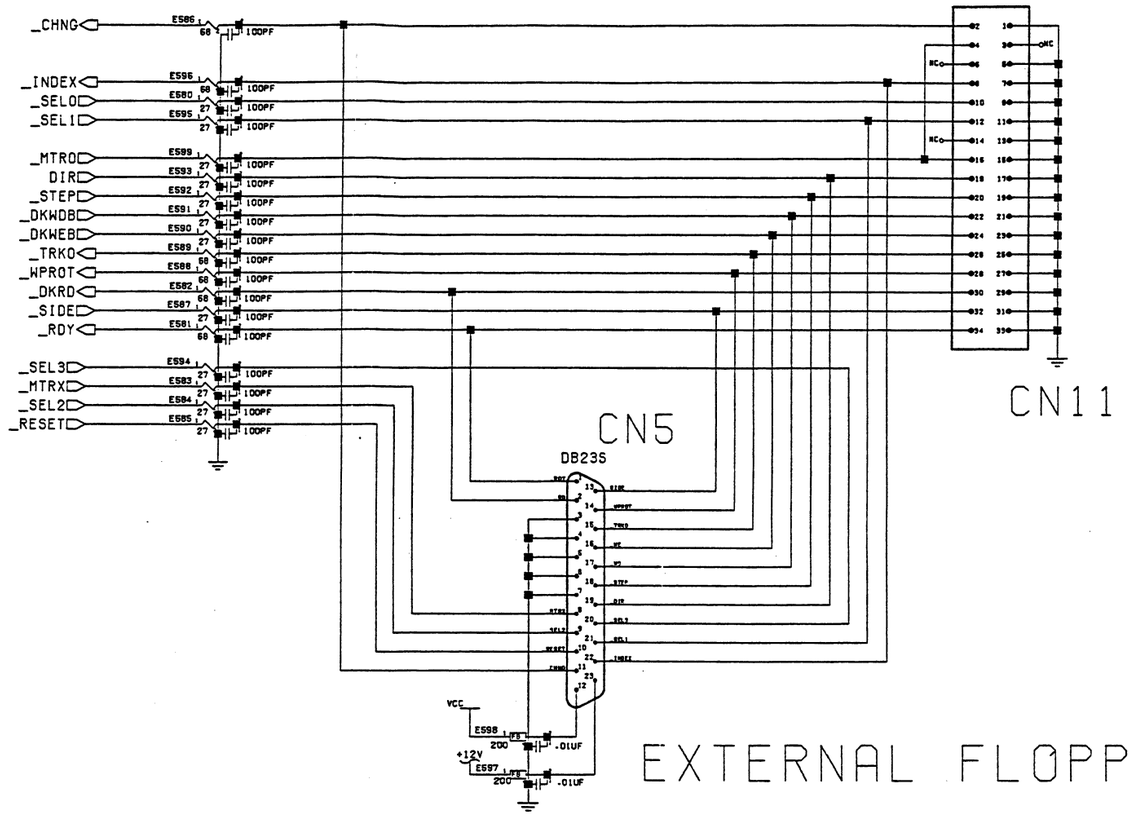
SCALE SHEET 7 11

MENTOR GRAPHICS VCR_SERVER 7.0

FLOPPY LOGIC

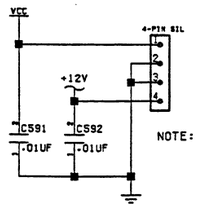


INTERNAL FLOPPY



EXTERNAL FLOPPY

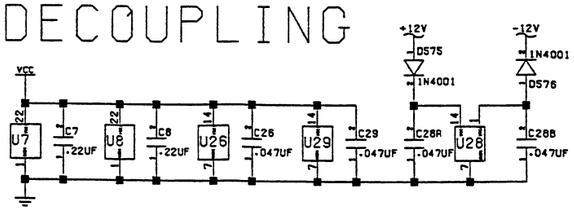
FLOPPY POWER



CN12

NOTE: SOME DRIVES ARE +5 ONLY...

DECOUPLING



A1200 REV 1->1D PCB

THE REST OF THE FLOPPY STUFF

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COMMODORE
SCHEMATIC A1200 RID
C/A1200 MAIN BOARD
"CHANNEL Z"
SIZE C | 364717 | 8
SCALE
SHEET 8 OF 13

KEYBOARD TAIL

CN13

KEYBOARD MPU

U13

68HC05C

KEYBOARD MICRO

R621 4.7KX9

R622 100

R624 4.7KX9

R625

R626 1M

Y621 3MHZ

22PF C621

22PF C622

R623 10K

R625

R629 10K

C629 .33UF

U49 RHSVR43R

IRQ

RESET

KB_CLOCK

KB_DATA

KB_RESET

PWR_BAD

POWER OK

KB LEDS

CN14

OPTIONAL

_IDE_LED

R631 10K

R632 4.7K

Q631 2N3906

_CC_ENA

R637

R638

Q634

_MTRO

R633 10K

R634 4.7K

Q632 2N3906

_LED

R635 10K

R636 4.7K

Q633 2N3906

R639 100

U13 POWER

C13 .22UF

A1200 REV 1->1D PCB

THE NEW HOME OF THE KEYBOARD VIRS

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COMMODORE

SCHEMATIC A1200rev1D

C/A1200 MAIN BOARD

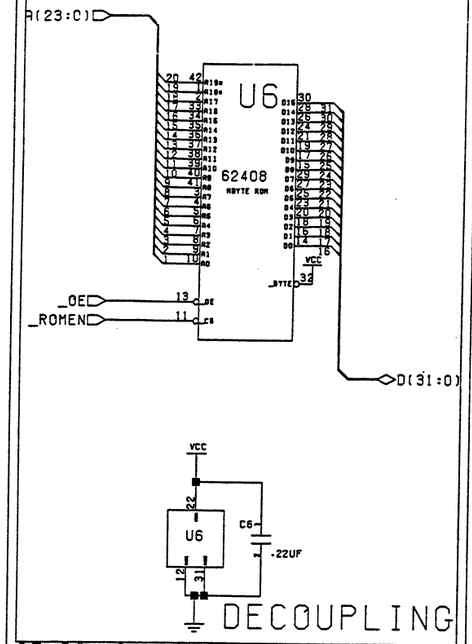
CHANNEL 2*

SIZE C 136471 B

SCALE SHEET 8 OF 8

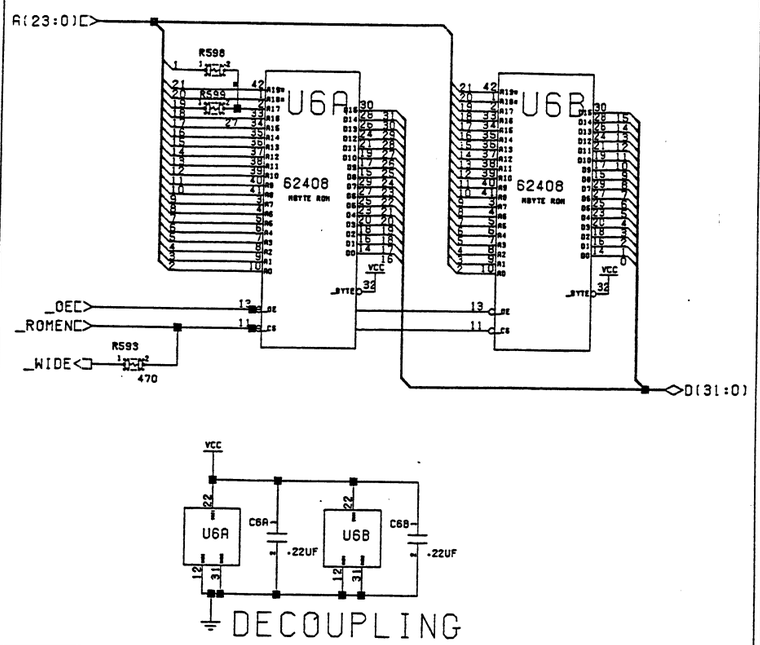
MENTOR GRAPHICS VCR_SERVER 7.0

16-BIT ROM



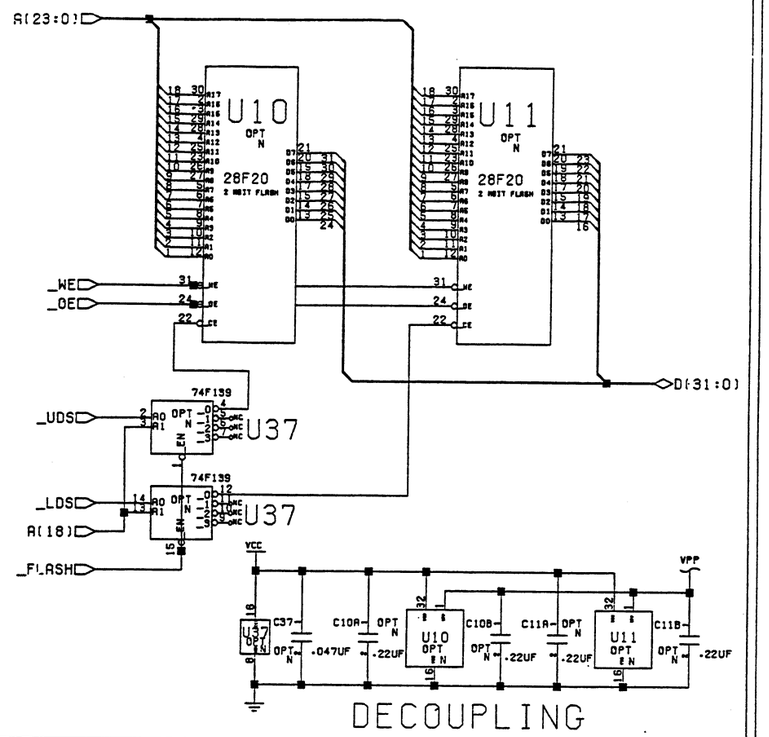
IF ROM16="YES"

32-BIT ROM



IF ROM32="YES"

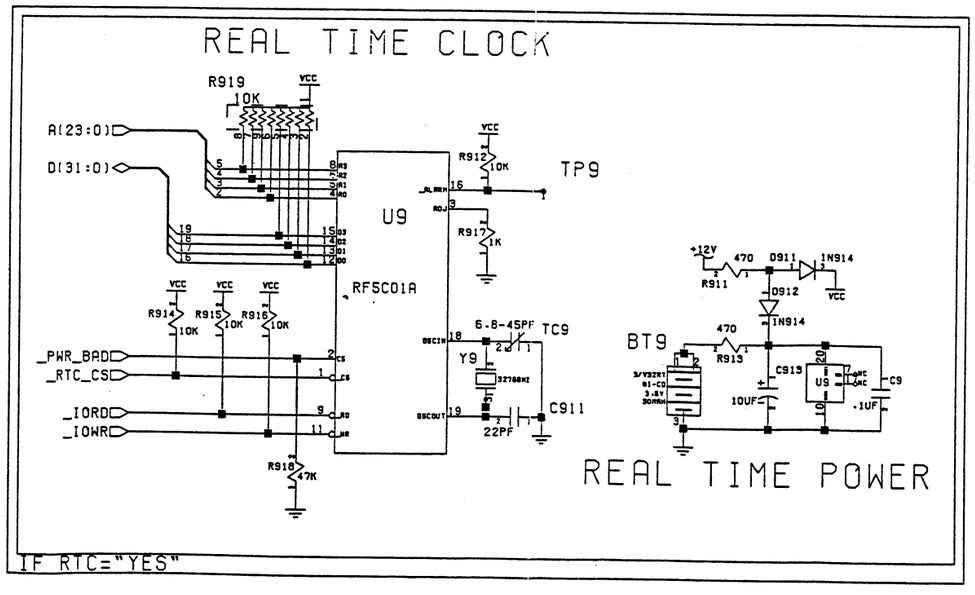
FLASH MEMORY



IF FLASH="YES"

16 AND 32-BIT SOCKETS MAY OVERLAP!

REAL TIME CLOCK

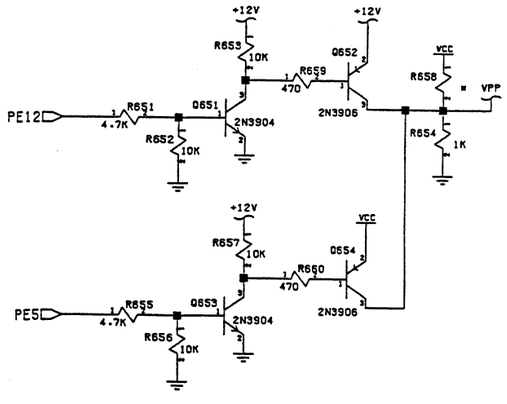


IF RTC="YES"

OPTIONAL REAL-TIME CLOCK/CALENDAR

OPTIONAL FLASH MEMORY

PROGRAMMING VOLTAGE



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ROM - PLAIN AND FANCY - DODADS TOO!

COMMODORE

SCHEMATIC A1200 R1D
C/A1200 MAIN BOARD
"CHANNEL Z"

C | 364717 | B

SCALE | SHEET 10 OF 13

MENTOR GRAPHICS VCR_SERVER 7.0

A1200 REV 1->1D PCB

MEMORY CARD

CN15

WARNING:
BYTE SWAPPED

A[23:1]

CC_A0

U45 74LS245

U46 74LS245

U47 74LS245

R714R 120

R714B 120

BUS PART
U20
BUDGIE
391425

R701 10K

CC_D[15:0]

CC_A[25:0]

R717 10K

R718 10K

_CC_CD(1)
_CC_CEU
_CC_CEL
_CC_OE
_CC_IORD
_CC_IOWR
_CC_WE_PGM
_CC_BUSY_IREQ
_CC_RESET
_CC_WAIT
_CC_REG
_CC_BVD(2)
_CC_BVD(1)
_CC_WP
_CC_CD(2)

C701 .22UF

C702 .22UF

U43 74LS245

R716 10K

_OE
_WE
_IORD
_IOWR
_UDS
_LDS
_REG
_CC_WAIT

_CC_OE
_CC_WE_PGM
_CC_IORD
_CC_IOWR
_CC_CEU
_CC_CEL
_CC_REG
_WAIT

_CC_ENA

R715 10K

CARD FUNCTIONS
U5
4145F023A
AA_GAYLE

_CC_CD(1)
_CC_CD(2)
_CC_BVD(1)
_CC_BVD(2)
_CC_WP
_CC_BUSY_IREQ
_REG
_WAIT
_IORD
_IOWR
_OE
_WE
_CC_ENA
CC_A0
CC_RESET

PE5
PE12
NOISE
.22UF C711

_IDE_IRQ
_IDE_CS(1)
_IDE_CS(2)
_INT2
_INT6

R715Y 10K

R715X 4.7K

U43 .22UF
U45 .22UF
U46 .22UF
U47 .22UF

A1200 REV 1->1D PCB

THE KISSY FACE CREDIT CARD MONSTER

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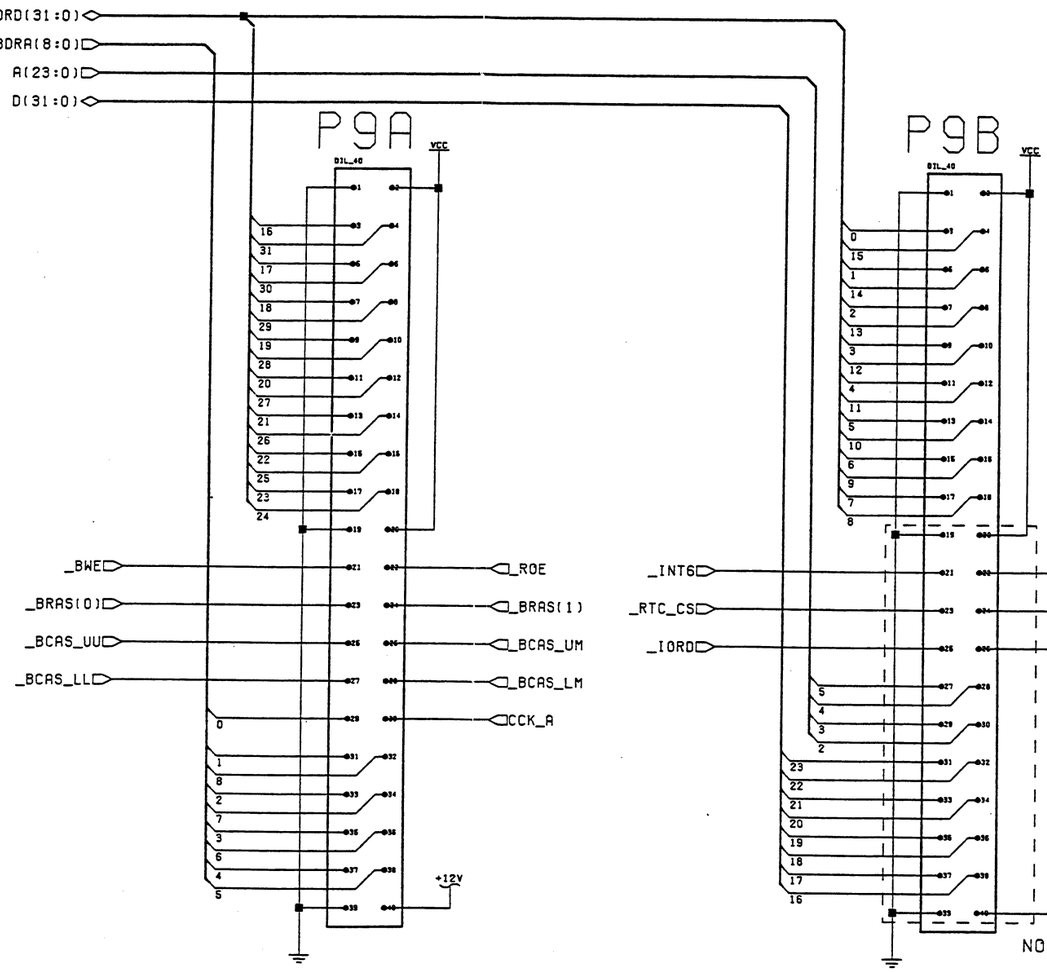
DESIGN BY: | DATE
S. AMBENS | 08/15/90

COMMODORE
SCHEMATIC A1200 R1
C/A1200 MAIN BORD
"CHANNEL Z"

SIZE C | 364717 | D
SCALE | SHEET 1 OF 9

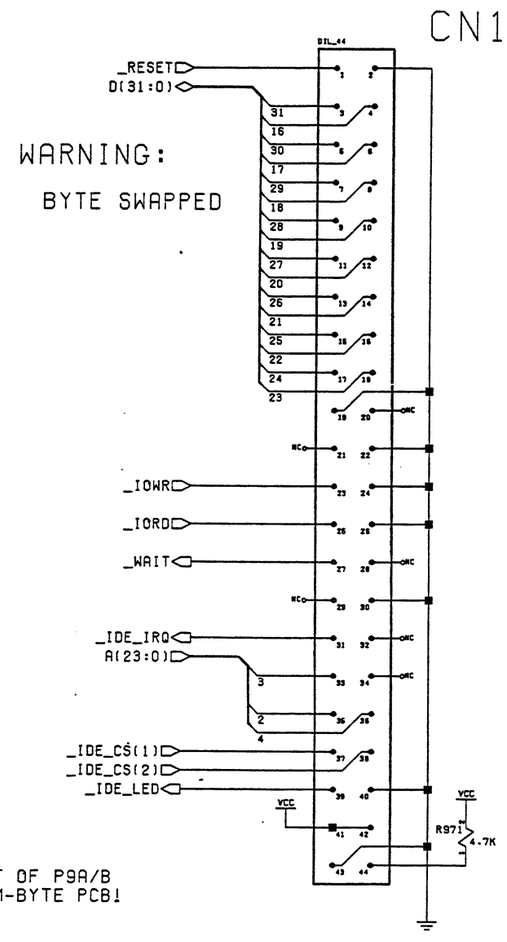
MENTOR GRAPHICS VCR_SERVER 7.0

MEMORY EXPANSION



NOTE: ONLY THIS BIT OF P9A/B
LOADED FOR 2M-BYTE PCB!

IDE DRIVE



A1200 REV 1->1D PCB

MEMORY EXPANSION AND THE IDE DRIVE

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COMMODORE
SCHEMATIC A1200 R1D
C/A1200 MAIN BOARD
"CHANNEL Z"
SIZE C | 364717 | B
SCALE
SHEET 12 OF 13

EXPANSION CONNECTOR

P1

A(31:0)
D(31:0)
VCC

_IPL(2:0)
FC(2:0)
_RST
_ECS
SIZE_1
_AS
R_W
_STERM
_DSACK_1
CPUCLK_A
_CDIS
DELETED R1B PCB
_CIIN
_CBREQ
_BR
_BGACK
_FPU_CS
CCK_A
_NET_CS
_RTC_CS
_REG
_WAIT
_IORD
_OE
_OVR
_ZORRO
_INT2
SYSTEM_1
SYSTEM_0
_CONFIG_OUT
_XRXD
LEFT

_IPEND
_HLT
_OCS
SIZE_0
_DS
_BEER
_AVEC
_DSACK_0
DE
_RMC
_CIOUT
_CBACK
_BG
_BOSS
_FPU_SENSE
_RESET
_SPARE_CS
_FLASH
_CC_ENA
_KB_RESET
_IOWR
_WE
XRDY
_WIDE
_INT6
_XTXD
RIGHT
+12V
-12V
EDGE_150

POWER INPUT

CN8
5-PIN SQ
+12
GND
+12V
+5
SH
LF1
LINE FILTER
LF1A
LF1B
LF1C
LF1D
F8
C800 .01UF
C802 .01UF
C803 .01UF
C801 .01UF
C804 .22UF
C821 47UF
C822 47UF
C811 1000UF
+12V
-12V
VCC

NOTE: HEAVY LINES INDICATE A SINGLE POINT CONNECTION

HOLES &C.

CN1
CN2
CN5
CN6
CN7
CN9
CN15
MT1
MT2
MT3
MT4
MT5
MT6
MT7
MT8
V1
V2
V3
V4
V5
V6
V7
V8
V9
V10
V11
V12
V13
V14
V15

TEST ACCESS

10-PIN SIL

TP1
CPUCLK
_AS
_DS
R_W
_DSACK_0
_DSACK_1
_ROMEN
_CDIS
_KB_RESET

TP2
CCK
CCKQ
_RAMEN
_REGEN
_BLS
_OEB
_RAS
_CAS
_DWE

TP3
RGA(8:1)
_DBR

TERMINATION

VCC
_HLT R951A 4.7K
_RST R951B 4.7K
SIZE_0 R951C 4.7K
SIZE_1 R951D 4.7K
R_W R951E 4.7K
_AS R951F 4.7K
_DS R951G 4.7K
_DSACK_0 R952A 470
_DSACK_1 R952B 470
_BEER R101 470
_AVEC R103 470
_CDIS R102 1K
_BR R104 1K
_IPL(2:0) R953A R953B R953C 470
FC(2:0) R953D R953E R953F 470
_INT6 R954A 1K
_INT2 R954B 1K
_OVR R954C 470
XRDY R954D 470
_ZORRO R954E 1K
_WIDE R592 1K

SYSTEM CONFIGURATION BITS

SYSTEM	1	0	CPU/CPUCLK
	0	0	EC020/14MHZ
	0	1	020/14MHZ
	1	0	030/14MHZ
	1	1	030/>14MHZ

POWER DISTRIBUTION AND DECOUPLING

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DESIGN BY: S. FUHRER
DRAWN BY:
CHK'D:
APP'D:
RELEASED: 6/26/1990
UNITS: INCHES
DWG.ST 0097
364710

COMMODORE
SCHEMATIC A1200 R1
C/A1200 MAIN BOARD
CHANNEL Z
SIZE C
364717
SCALE
SHEET 13 OF 36

A1200 REV 1->1D PCB

MENTOR GRAPHICS VCR_SERVER 7.0